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Geochemical and Till Pebble Lithology Data, Surficial Sediment Sampling Program, Schreiber–Killala Lake Area, Northwestern Ontario

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ONTARIO GEOLOGICAL SURVEY

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Geochemical and Till Pebble Lithology Data, Surficial Sediment Sampling Program, Schreiber–Killala Lake Area, Northwestern Ontario

by

T.F. Morris

2001

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*Miscellaneous Release—Data 74

Geochemical and Till Pebble Lithology Data Related to the Schreiber–Killala Lake Overburden Mapping and Sampling Program, Northwestern Ontario; by T.F. Morris.

This release consists of sample site locations, geochemical and pebble lithology data for humus and till "B" and "C" horizon material collected in the Schreiber–Killala Lake area of northwestern Ontario. These data are being released in conjunction with OFR 6056. Files include information on: abbreviations used; sample site locations; analytical methods and detection limits; humus and till standard and duplicate analysis; orientation survey geochemistry; regional humus geochemistry; regional till "B" geochemistry; regional till "C" geochemistry; and till pebble data. Data are available as compressed files in ASCII (.txt) and Microsoft® Excel® (.xls) file format on one 3.5-inch MS-DOS® diskette.

This diskette is available separately from the report.

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ABSTRACT

In 1999 and 2000, a series of humus and "B" and "C" horizon till samples were collected as part of an overburden sampling program completed by the Ontario Geological Survey in the Schreiber-Killala Lake area, northwestern Ontario. Samples were collected for geochemical and pebble lithology determination as part of orientation and regional overburden surveys. The purpose of the orientation surveys was to characterize the geochemical response in till over areas of known mineralization, namely, gold, volcanogenic massive sulphide mineralization and rare element carbonatite. These data were compared to anomalous values derived from the regional data in an attempt to identify exploration targets for these types of mineralization. In addition, anomalous heavy mineral values from the 2000 regional data were compared to suites of heavy minerals associated with magmatic sulphide mineralization and kimberlite.

Potential volcanogenic massive sulphide, magmatic sulphide, kimberlite and rare element carbonate exploration targets were identified. No strong gold exploration targets were determined from the regional till geochemical data base, however, there are some interesting associations with gold exploration targets identified by previously published lake sediment geochemical surveys.

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INTRODUCTION

Study Location

The Schreiber-Killala Lake study area is located 20 km west of Marathon in northwestern Ontario and includes the towns of Terrace Bay and Schreiber (Figure 1). The study area is represented by 6, 1:50 000 scale National Topographic System (NTS) map sheets including: a) Killala Lake (42 E/2); b) Coldwell (42 D/15); c) Dickison Lake (42 E/3); d) Schreiber (42 D/14); e) Slate Islands (42 D/11); and f) Pic Island (42 D/10). The study area is bounded by longitudes 87°30'W and 86° 30'W and latitudes 48°30'N and 48°45'N.

Project History

The Ontario Geological Survey (OGS) has defined the Kapuskasing Structural Zone (KSZ; Figure 1) as an area of high potential for diamond exploration. The potential for diamonds has been established through overburden mapping and sampling programs that have defined the types, concentrations and distribution of several important kimberlite indicator minerals (KIMs; Morris, Crabtree et al. 1998; Morris, Crabtree and Averill 1998; Morris, Crabtree and Pianosi 1997; Morris et al. 1994; Stephenson et al. 1999). Kimberlite is a rock type commonly recognized as the primary host for diamond. KIMs are a suite of heavy minerals (specific gravity greater than 3.2) associated with kimberlite (Cr-pyrope garnet, chromite, Mg-rich ilmenite, Cr-diopside and forsteritic olivine). Since release of the OGS studies, diamond-bearing rock and kimberlite have been discovered in the Wawa area (KWG Resources Inc., Press Releases, 20/08/97 and 31/07/00; CANABRAVA Diamond Corporation, Press Release, 09/12/97; Band-Ore Resources Ltd., Press Release, 02/05/00; Pele Mountain Resources Inc., Press Releases 07/07/00 and 03/01/01; Dumont Nickel Inc., Press Release, 21/08/00).

In addition to KIMs, overburden samples collected over the KSZ were processed for metamorphic or magmatic massive sulphide indicator minerals (MMSIMs®). The MMSIMs® are associated with 3 main types of base metal deposits: 1) volcano-sedimentary massive sulphides in high grade metamorphic terrain; 2) skarn and greisen deposits; and 3) magmatic Ni-Cu sulphides (Averill 1999). The composition of gahnite, a rare and important MMSIM® associated with metamorphosed volcanosedimentary massive sulphide deposits, can also be used to indicate the presence of rare element pegmatite (Morris, Breaks et al. 1997).

In addition to the heavy mineral program, overburden geochemistry was determined primarily from humus, and "B" and "C" horizon material of subglacial tills. The geochemical data sets for the material collected from the Wawa area were evaluated against suites of elements associated to specific types of mineralization. From this, several base metal and gold exploration targets were defined (Morris 1999a).

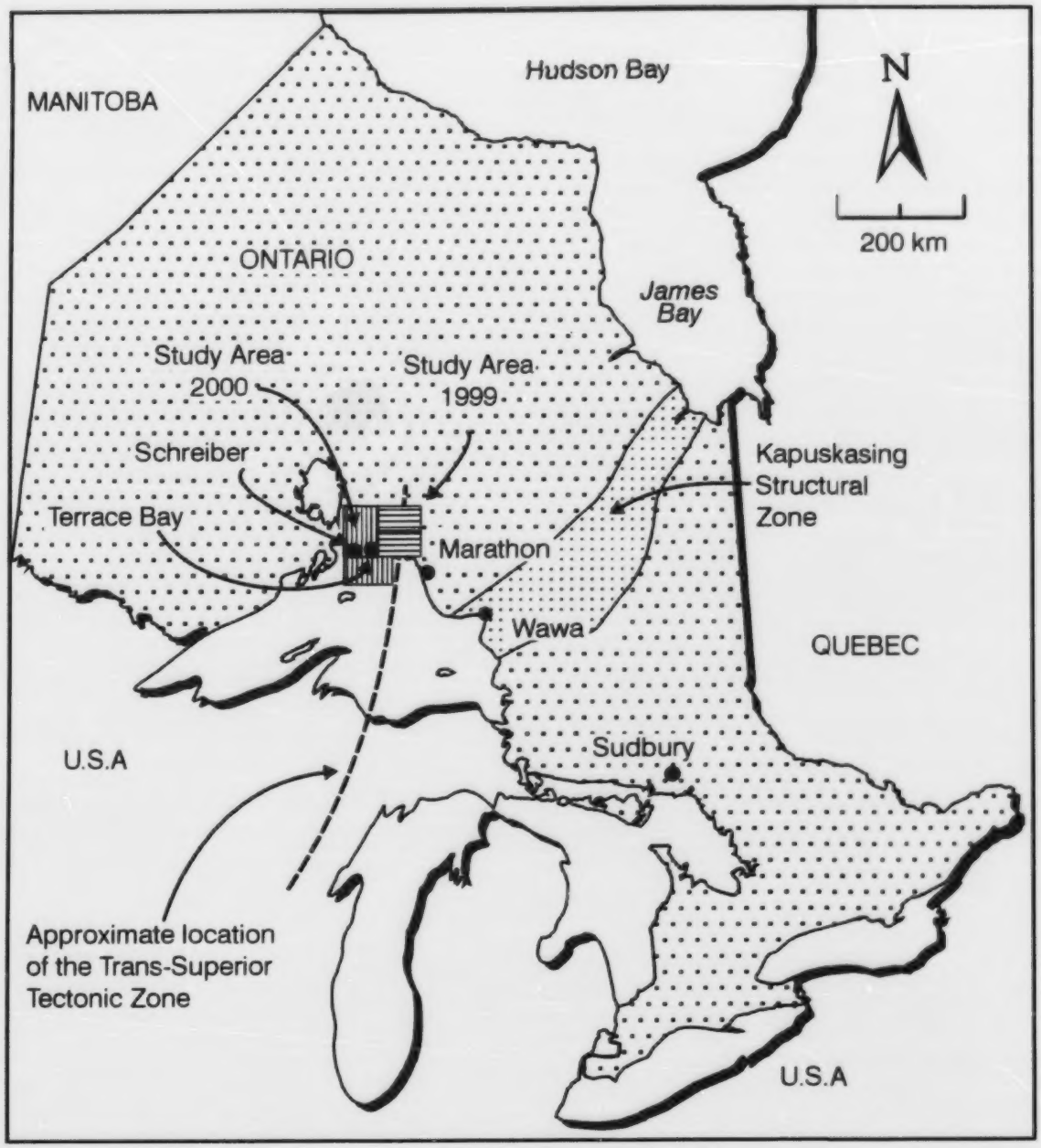


Figure 1. Study area location.

Following the success of the Quaternary mapping and sampling programs over the KSZ similar programs were undertaken over part of the Trans-Superior Tectonic Zone (TSTZ) (Morris 1999b, 2000). The TSTZ extends from Michigan north-northeast into Ontario, west of Marathon (Figure 1). Kimberlites straddle the structure within Michigan (Cannon and Mudrey 1981) and ultramafic lamprophyres, which may belong to the kimberlite "clan" (Rock 1990) are recognized in association with the TSTZ within Ontario (Sage 1991a). The TSTZ represents a fault system that has been accompanied by emplacement of mantle material (Sage 1999). In addition, the TSTZ is located within an Archean craton and is associated with a dike swarm (mantle-root friendly structure); conditions that are favorable for kimberlite emplacement and diamond preservation (Morris and Kaszycki 1997).

During the 1999 field season the focus of field investigations in the TSTZ centered on the Killala Lake-Coldwell area (Morris 1999a). From this work, several kimberlite, base metal and rare-element carbonatite targets were identified through suites of heavy minerals recovered from modern alluvium and till samples. During the 2000 field season, investigations shifted west of the TSTZ, encompassing 2 additional NTS sheets; the Dickison Lake (42 E/3) and Schreiber (42 D/14) sheets. This was done to evaluate the western flank of the TSTZ for kimberlite potential and to assess the gold, base metal and rare-element carbonatite potential of the Schreiber area. The Slate Islands, located south of Terrace Bay and straddling the TSTZ, were also included within the coverage area for the 2000 field season. These islands were included within the study to provide surficial geology information for land use purposes and to characterize heavy mineral and geochemical signatures for till and modern alluvium materials on the islands.

Purpose

This report presents geochemical data derived from humus and subglacial till "B" and "C" horizon material. This information is useful in providing regional baseline geochemical data for environmental studies and mineral exploration. In addition, specific exploration targets for kimberlite, base metal and rare-element carbonatite exploration are identified. The location of sample sites with modest gold geochemical signatures are also identified.

Physiography

The study area is located south of the Great Lakes-Hudson Bay drainage divide and all surface drainage flows south into Lake Superior. There are 9 major drainage basins within the study area. Flow from these basins is through the Pays Plat, Whitesand, Aquasobon, Steel, Prairie and Little Pic rivers, the Big Duck, Blackbird and Deadhorse creeks.

Much of the area lies within the Abitibi Uplands subregion of the James physiographic region (Bostock 1976). This region is underlain by crystalline Archean rocks and characterized by a broad rolling surface that rises gently from the Hudson Bay Lowland. Locally, several distinctive cross-cutting faults occur. The Gravel River-Kamuck River fault, the most prominent of these, has a floor width averaging 60 m and vertical valley walls up to 150 m high (Carter 1988). Along the shoreline of Lake Superior the study area falls within the Port Arthur Hills subregion of the James physiographic region (Bostock 1976). This subregion consists of massive and rugged hills with relief in excess of 150 m (Gartner 1979a, 1979b).

REGIONAL GEOLOGY

Bedrock Geology

Most of the study area straddles a complex suite of rocks associated with the Quetico and Wawa subprovinces of the Canadian Shield (Harcourt 1939; Mason 1981a- e; Carter 1988; Ontario Geological Survey 1991; Figure 2). In the eastern part of the study area, these subprovinces are separated by the Killala Lake deformation zone: the zone is several kilometers wide and composed of primarily migmatite (Williams 1989). Both subprovinces consist of Neo-Mesoarchean (2.5-3.4 Ga) intrusive and supracrustal rocks. Several islands within Lake Superior are included within the study area. The bedrock of these islands, and in places along the north shore of Lake Superior, consists of Late Precambrian (1086-1107 Ma) to Middle Precambrian (1.6-2.5 Ga) sedimentary rocks.

Neo-Mesoarchean intrusive bedrock of the Quetico subprovince consists of a gneissic tonalite suite and muscovite-bearing granitic to granodiorite rocks. Quetico supracrustal bedrock consists of a metasedimentary suite. Neo-Mesoarchean intrusive rocks of the Wawa subprovince include a massive granodiorite to granite suite, a gneissic tonalite suite and mafic and ultramafic rocks (gabbro, anorthosite, ultramafics). Wawa subprovince supracrustal rocks of the same age include a metasedimentary suite, felsic to intermediate metavolcanic rocks and mafic to intermediate metavolcanic rocks.

Within the study area along the north shore of Lake Superior there are 2 areas of sedimentary rock belonging to the Gunflint Formation of the Middle Precambrian (1.6-2.5 Ga) Animikie Group (Carter 1988). Offshore, several islands consist of sedimentary rocks belonging to the Late Precambrian (1086-1107 Ma) Sibley Group (Ontario Geological Survey 1991).

Cross-cutting these rocks are at least 2 dike swarms. The oldest is the northeasterly striking Marathon dike swarm that was emplaced around 2.17 Ga (Osmani 1991). The younger Pukaskwa dike swarm, is related to the volcanic rocks of the Keewenawan Supergroup that were deposited within the Midcontinent Rift between 1109 and 1086 Ma (Osmani 1991).

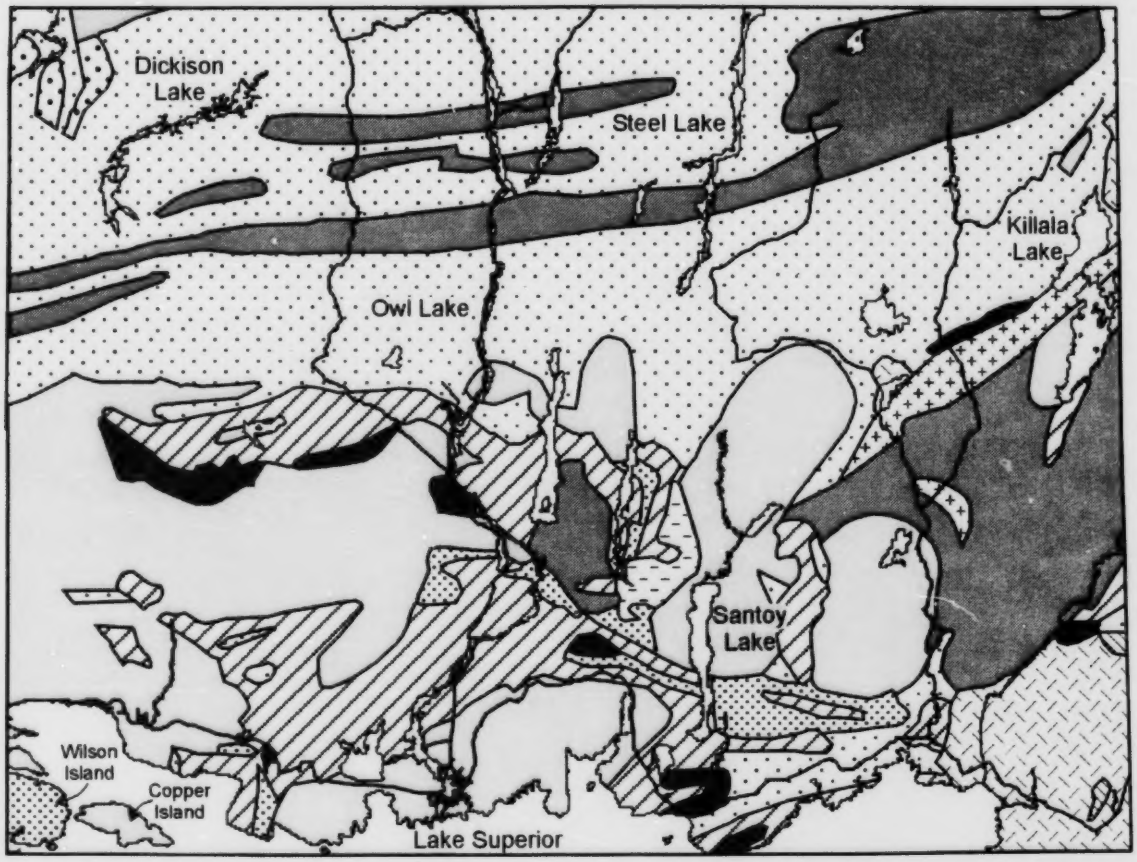


Figure 2. Bedrock geology of the Schreiber-Killala Lake area (from Ontario Geological Survey 1991).

The study area straddles the western edge of the TSTZ, a prominent structural feature that extends north-northeast from Michigan. In Michigan, several kimberlites have been identified within the TSTZ. This tectonic zone was emplaced between 1.0 to 1.2 Ga (Sage 1991a). During this time several diatreme structures (Sage 1982), the Prairie Lake carbonatite complex (Sage 1987), the Killala Lake alkalic complex (Sage 1988) and the Coldwell alkalic complex were emplaced (Sage 1991a).

Quaternary Geology

All glacial landforms and related materials within the study area were deposited during the Wisconsinan glaciation. Bedrock erosional features, materials and landforms associated with this glacial advance include ice flow indicators (striae, grooves, whalebacks, chattermarks) and thin till over bedrock (subglacial till). The orientation of ice flow indicators defines the regional ice flow pattern across the area, striae range from 165-238° with an average of 194°. In general, more southerly flow was restricted to bedrock controlled troughs, such as those associated with the Aguasabon River and Long Lake, whereas more southwesterly flow occurred across topographically higher terrane. The only set of cross-cutting striae observed within the area were found within the Deadhorse Creek drainage basin. There, a younger set of southerly oriented striae was attributed to late ice flow associated with thinning of the ice sheet. An older, more southwesterly oriented set of striae were attributed to the established, regional flow (Morris 1999b). Drumlinoid forms in the north-central part of the study area are aligned in the direction of regional flow.

A thin, discontinuous till occurs throughout most of the study area. In general, this till is less than 1 m thick but greater accumulations are found within bedrock depressions or fractures and on the down-ice (lee) side of bedrock highs. Near Lake Superior, below 305 m elevation, locating subglacial till is very difficult as much of this material was washed and reworked by the different glacial and post-glacial lake levels associated with the Lake Superior basin.

The till is, in general, massive, however, faint shearing associated with the lodgment process or flow structure associated with subglacial cavity fill were sometimes observed. Generally, the till is compact with abundant pebbles of local lithologies. However, it is worth noting that over the Quetico metasedimentary terrane the till often did not contain "fresh" or "solid" metasedimentary pebbles. These pebbles were most likely weathered by pedogenic processes (although more were preserved in the "C" horizon) and often only a distinct heavy mineral concentrate was left.

On the down-ice side of prominent bedrock topography, the till consisted of boulder-sized material, making sampling extremely difficult at these locations. The till matrix does not react with 10% HCl indicating that it contains little or no carbonate material.

Landforms and materials associated with ice margin retreat are located primarily within bedrock controlled valleys. Ice-contact stratified drift is associated with recessional moraines, dead-ice topography, eskers and valley fill deposits. Within recessional moraine, dead-ice topography and valley fills, flow till (deposited proximal to the ice maregin in a proglacial environment) and poorly sorted pebbly sand (containing a variety of clast types from local material to Hudson Bay derived Paleozoic clasts) were observed. At several sites, the matrix of this flow till material reacts strongly with 10% HCl. Several well-developed eskers occur within the Long Lake valley. Several sections through these eskers revealed well-sorted sand and coarse gravel.

Glaciofluvial outwash consisting of well-sorted sands to coarse boulders, of primarily local provenance, were identified within several narrow bedrock controlled valleys. Occasionally, the bedrock controlled channels associated with this material terminated at deltas that mark the elevation of former glacial and post-glacial lakes.

Glaciolacustrine materials were deposited within 2 different environments. Within the Dickison Lake area, straddling the Wintering Road, fine-textured sand was deposited where glacial meltwater was trapped between the ice margin and higher ground. Closer to Lake Superior, coarse-grained glaciolacustrine materials were deposited within bedrock controlled valleys. These deposits are associated with the historic lake levels of the Lake Superior basin (Farrand 1960; Farrand and Drexler 1985). The elevation of each of these lakes is defined by terrace surfaces, beach ridges and wave-cut benches. Post- glacial features such as colluvium and modern shoreline features (such as bars and spits) were also observed.

SAMPLING METHODS

Sampling Media

Subglacially deposited till is the ideal material to collect and analyze for local geochemical and heavy mineral signatures as it consists of locally derived materials (Morris and Kaszycki 1997). At each till sample site, 3, 200 g subsamples were collected; one each of humus and till "B" and "C" horizon material. Sample site locations with humus, till "B", "C" and pebble sample numbers are summarized in Appendix A (this report) and Morris (2001, Appendix A).

In addition, a 10 kg till "C" horizon and pebble sample were collected at each site. The 10 kg sample was sieved through a 7 mm mesh, steel sieve to exclude the coarse fraction. Approximately 50 pebbles were collected from the coarse fraction for each till sample and pebble lithologies determined. The 200 g samples of humus and till "B" and "C" horizon material were submitted for instrumental neutron activation analysis (INAA), inductively coupled plasma (ICP) multi-element geochemical analysis. The 10

kg till "C" horizon sample was submitted for heavy mineral concentration and subsequent heavy mineral analysis. Results from the 10 kg till "C" horizon samples collected during the 1999 summer field season have been published in Morris et al. (2000). The 10 kg till "C" horizon samples collected from the 2000 field season are currently being processed and the heavy mineral results will be published at a later date.

Observations made at each sample site included both a site description (sample site material type, surrounding material type, presence of bedrock or boulders, topography, channel surface slope, stream flow, drainage of surrounding area, vegetation) and a material description (colour, texture, structure, consistency, plasticity, pebble abundance, size, shape, surface features and type and horizon boundary characteristics).

Sampling Strategy

Orientation Surveys

Four orientation surveys were completed over different bedrock lithologies (Table 1). The aims of the surveys were to: a) determine the lithologic, heavy mineral and geochemical signature of overburden material over the different bedrock lithologies; and b) characterize the scale and form of glacially dispersed materials.

Subglacial till samples were collected over the: Prairie Lake Carbonatite; the Cameco Gold Inc. gold property at Empress Hill; the Major General Resources Ltd. volcanogenic massive sulphide (VMS) base metal property at Spider Lake; and from the Slate Islands. Samples associated with these orientation surveys were excluded from the regional data base.

Regional Surveys

Regional till sampling and analysis defines the regional distribution and relative concentration of different elements contained within humus, "B" and "C" horizon samples of subglacial till. From these data, regional background and anomalous geochemical values can be evaluated in terms of potential exploration targets.

Site selection of the regional till sample locations was accomplished by placing a hypothetical 5 km^2 grid over the area. One hundred and eighteen grids were sampled for humus, till "B" and "C" materials.

Orientation Survey	Samples
Prairie Lake Carbonatite	385-Th-99, 386-Tb-99, 387-Tc-99, 389-Tp-99
	390-Th-99, 391-Tb-99, 392-Tc-99, 394-Tp-99
	395-Th-99, 396-Tb-99, 397-Tc-99, 399-Tp-99
	400-Th-99, 401-Tb-99, 402-Tc-99, 404-Tp-99
Cameco Gold Inc., Empress Hill Gold Property	468-Th-99, 469-Tb-99, 470-Tc-99, 472-Tp-99
	473-Th-99, 474-Tb-99, 475-Tc-99, 477-Tp-99
	478-Th-99, 479-Tb-99, 480-Tc-99, 482-Tp-99
	475-Th-99, 476-Tb-99, 477-Tc-99, 479-Tp-99
	453-Th-00, 454-Tb-00, 455-Tc-00, 456-Tp-00
Major General Resources Ltd., Spider Lake, Base Metal Property	422-Th-99, 423-Tb-99, 424-Tc-99, 426-Tp-99
	427-Th-99, 428-Tb-99, 429-Tc-99, 431-Tp-99
	432-Th-99, 433-Tb-99, 434-Tc-99, 436-Tp-99
	439-Th-99, 440-Tb-99, 441-Tc-99, 443-Tp-99
	444-Th-99, 445-Tb-99, 446-Tc-99, 448-Tp-99
	449-Th-99, 450-Tb-99, 451-Tc-99, 453-Tp-99
	454-Th-99, 455-Tb-99, 456-Tc-99, 458-Tp-99
	459-Th-99, 460-Tb-99, 461-Tc-99, 463-Tp-99
Slate Islands	328-Th-00, 329-Tb-00, 330-Tc-00, 332-Tp-00
	1255-Th-00, 1256-Tb-00, 1257-Tc-00, 1259-Tp-00

Table 1. Summary of samples associated with orientation surveys.

ANALYTICAL METHODS

Geochemical Analysis

Analytical methods, general statistics and detection limits used in the geochemical analyses of humus, "B" and "C" horizon till are summarized in Morris (2001, Appendix B). sample and duplicate sample geochemical data for each analytical method and material type is summarized in Morris (2001, Appendix C). Geochemical results for humus, "B" and "C" horizon till samples are summarized in Morris (2001, Appendices D, E, F and G).

Standards used for the humus samples include, 3 OGS internal standards (MS-1, MS-2; R. Dyer, Ontario Geological Survey, unpublished data) and 2 certified reference standards (LKSD-1, LKSD-4; Natural Resources Canada 1995). For the till "B" and "C" horizon samples one OGS internal reference standard (MCM-1, Bajc and Hall 2000) and 2 certified reference standards (Till-1, Till-4; Natural Resources Canada 1995) were used.

Precision, a measure of the reproducibility of the analytical determinations, was determined through analysis of duplicate pairs and mean precision was determined through multiple analysis of the standard samples. Calculations for determining precision and mean precision are summarized in Coker (1991).

Pebble Lithology

Pebble lithology was determined by comparing the lithological properties of pebbles to representative samples of local bedrock. Identified pebble lithologies include: granite; gneiss; metasedimentary; sandstone; mafic metavolcanic; felsic metavolcanic; felsic intrusive; carbonate; quartz; mafic intrusive; diatreme; ironstone; other and unknown. Till pebble data are summarized in Morris (2001, Appendix H).

DATA PROCESSING

Consideration of data derived from each geochemical analysis for each material sampled is not practical. Therefore, the analytical method that provided the best detection limit and reproducibility of results was determined for each element from the standard and duplicate data set (Morris 2001, Appendix C). Summaries of the analytical methods used for each element for humus, till "B" and "C" horizon material are presented in Tables 2 and 3. These data were then used to identify sites favorable for gold, kimberlite, base metal or rare element carbonatite. To do this, it is important to identify the location of anomalous geochemical values from humus, till "B" and "C" horizon samples. Proportional dot diagrams are very effective in illustrating the distribution and relative abundance of geochemical values. The largest dots represent sites with values greater than the 95th percentile. Sites with these values are considered anomalous, are considered significant and are the values that this report will focus on. Values below the 95th but above the 75th percentile are considered "elevated" above "background" values, and although they are not considered "significant", they should not be ignored when evaluating regional data for potential mineralization. Values below the 75th percentile are regarded as background and are not likely useful indicators of mineralization.

Proportional statistics and proportional dot diagrams were applied to each element determined for the humus, till "B" and "C" horizon samples. However, due to the large number of diagrams generated, none are presented in this report. Instead, diagrams summarizing the distribution of those sample sites with anomalous gold, kimberlite, base metal or rare element carbonatite signatures are presented. To generate these diagrams, a

Element	Material	Analytical Method	Detection Limit
Aluminum	Humus	ICP-MS	100 ppm
Antimony	Humus	ICP-MS	0.05 ppm
Arsenic	Humus	INAA	1 ppm
Barium	Humus	ICP-MS	1 ppm
Beryllium	Humus	ICP-MS	0.1 ppm
Bromine	Humus	INAA	1 ppm
Calcium	Humus	ICP-MS	100 ppm
Cadmium	Humus	ICP-MS	0.05 ppm
Cerium	Humus	INAA	1 ppm
Cesium	Humus	INAA	0.5 ppm
Chromium	Humus	ICP-MS	1 ppm
Cobalt	Humus	ICP-MS	0.05 ppm
Copper	Humus	ICP-MS	0.5 ppm
Europium	Humus	INAA	0.2 ppm
Iron	Humus	ICP-MS	100 ppm
Gallium	Humus	ICP-MS	0.05 ppm
Gold	Humus	ICP-AES-PGE	1 ppb
Hafnium	Humus	INAA	0.5 ppm
Iridium	Humus	INAA	5 ppb
Lanthanum	Humus	INAA	0.1 ppm
Lead	Humus	ICP-MS	0.05 ppm
Lithium	Humus	ICP-MS	0.5 ppm
Lutetium	Humus	INAA	0.1 ppm

Element	Material	Analytical Method	Detection Limit
Magnesium	Humus	ICP-MS	10 ppm
Manganese	Humus	ICP-MS	5 ppm
Mercury	Humus	INAA	0.5 ppm
Molybdenum	Humus	ICP-MS	0.1 ppm
Neodymium	Humus	INAA	3 ppm
Nickel	Humus	ICP-MS	0.5 ppm
Palladium	Humus	ICP-AES-PGE	1 ppb
Platinum	Humus	ICP-AES-PGE	0.5 ppb
Rubidium	Humus	INAA	20 ppm
Samarium	Humus	INAA	0.1 ppm
Scandium	Humus	ICP-MS	0.1 ppm
Selenium	Humus	INAA	2 ppm
Silver	Humus	INAA	2 ppm
Strontium	Humus	INAA	100 ppm
Tantalum	Humus	INAA	0.5 ppm
Thallium	Humus	ICP-MS	0.05 ppm
Thorium	Humus	INAA	0.5 ppm
Tin	Humus	ICP-MS	0.5 ppm
Titanium	Humus	ICP-MS	10 ppm
Tungsten	Humus	ICP-MS	0.05 ppm
Uranium	Humus	INAA	0.1 ppm
Vanadium	Humus	ICP-MS	10 ppm
Ytterbium	Humus	INAA	0.1 ppm
Zinc	Humus	ICP-MS	1 ppm

ICP-AES:Inductively Coupled Plasma- Atomic Emission Spectroscopy
ICP-AES-PGE: Inductively Coupled Plasma- Atomic Emission Spectroscopy, Platinum Group
ICP-MS: Inductively Coupled Plasma-Multi-Element Analysis
INAA: Instrumental Neutron Activation Analysis

Table 2. Summary of analytical methods used to determine geochemistry of humus.

simple ranking system was applied to each site. This ranking system is based on the number of anomalous elements determined from the humus, till "B" and "C" horizon samples. For example, samples 1237-Tb-00 (till "B" horizon) and 1238-Tc-00 (till "C" horizon), both collected from the same sample site, have 12 anomalous geochemical values between them (Ni, Mg, Co, V, Cu and Ba). This site was subsequently given a rank of 12. This ranking system was applied to all sites and proportional dot diagrams generated. Although simple, this ranking system was very effective at highlighting those sites with multiple geochemical anomalies from the humus, "B" and "C" horizon samples.

Element	Material	Analytical Method	Detection Limit
Aluminum	Till "B", "C"	ICP-MS	30 ppm
Antimony	Till "B", "C"	ICP-AES	0.5 ppm
Arsenic	Till "B", "C"	INAA	0.5 ppm
Barium	Till "B", "C"	ICP-AES	1 ppm
Beryllium	Till "B", "C"	ICP-AES	0.1 ppm
Bromine	Till "B", "C"	INAA	0.5 ppm
Calcium	Till "B", "C"	ICP-AES	15 ppm
Cadmium	Till "B", "C"	ICP-MS	0.05 ppm
Cerium	Till "B", "C"	INAA	3 ppm
Cesium	Till "B", "C"	INAA	1 ppm
Chromium	Till "B", "C"	ICP-MS	1 ppm
Cobalt	Till "B", "C"	ICP-MS	0.05 ppm
Copper	Till "B", "C"	ICP-MS	0.5 ppm
Europium	Till "B", "C"	INAA	0.2 ppm
Iron	Till "B", "C"	ICP-AES	5 ppm
Gallium	Till "B", "C"	ICP-MS	0.05 ppm
Gold	Till "B", "C"	ICP-AES-PGE	1 ppb
Hafnium	Till "B", "C"	INAA	1 ppm
Iridium	Till "B", "C"	INAA	5 ppb
Lanthanum	Till "B", "C"	INAA	0.5 ppm
Lead	Till "B", "C"	ICP-MS	0.05 ppm
Lithium	Till "B", "C"	ICP-MS	0.5 ppm
Lutetium	Till "B", "C"	INAA	0.05 ppm
Magnesium	Till "B", "C"	ICP-MS	10 ppm
Manganese	Till "B", "C"	ICP-AES	1 ppm
Mercury	Till "B", "C"	INAA	1 ppm

Element	Material	Analytical Method	Detection Limit
Molybdenum	Till "B", "C"	ICP-MS	0.1 ppm
Neodymium	Till "B", "C"	INAA	5 ppm
Nickel	Till "B", "C"	ICP-MS	0.5 ppm
Palladium	Till "B", "C"	ICP-AES-PGE	1 ppb
Phosphorous	Till "B", "C"	ICP-AES	50 ppm
Platinum	Till "B", "C"	ICP-AES-PGE	0.5 ppb
Potassium	Till "B", "C"	ICP-AES	100 ppm
Rubidium	Till "B", "C"	INAA	15 ppm
Samarium	Till "B", "C"	INAA	0.1 ppm
Scandium	Till "B", "C"	ICP-MS	0.1 ppm
Selenium	Till "B", "C"	INAA	3 ppm
Silver	Till "B", "C"	INAA	5 ppm
Sodium	Till "B", "C"	ICP-AES	10 ppm
Strontium	Till "B", "C"	INAA	0.05%
Sulphur	Till "B", "C"	ICP-AES	30 ppm
Tantalum	Till "B", "C"	INAA	0.5 ppm
Terbium	Till "B", "C"	INAA	0.5 ppm
Thallium	Till "B", "C"	ICP-MS	0.05 ppm
Thorium	Till "B", "C"	INAA	0.2 ppm
Tin	Till "B", "C"	ICP-MS	0.5 ppm
Titanium	Till "B", "C"	ICP-AES	3 ppm
Tungsten	Till "B", "C"	ICP-MS	0.05 ppm
Uranium	Till "B", "C"	INAA	0.5 ppm
Vanadium	Till "B", "C"	ICP-AES	5 ppm
Ytterbium	Till "B", "C"	INAA	0.2 ppm
Zinc	Till "B", "C"	ICP-MS	1 ppm

ICP-AES:Inductively Coupled Plasma- Atomic Emission Spectroscopy
ICP-AES-PGE: Inductively Coupled Plasma- Atomic Emission Spectroscopy, Platinum Group
ICP-MS: Inductively Coupled Plasma-Multi-Element Analysis
INAA: Instrumental Neutron Activation Analysis

Table 3. Summary of analytical methods used to determine geochemistry of till "B" and "C" horizon material.

In this study, elements related to sulphide hosted gold (Au, As), kimberlite (Nb, Cr, Ni, Ti, Mg, Co, Zr, V, Cu, Sr, Ba), VMS (Co, Cu, Ni, Pb, Zn), magmatic sulphide (MS; Co, Cu, Ni, Au, W, PGE [Pt, Pd, Rh, Ru, Os, Ir]) and rare-earth carbonatite (Be, Cs, Hf, Li, Nb, Rb, Sc, Ta, Th, U, Re [La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu]) were considered as representative for the various types of mineralization (Levinson 1979; Fortescue et al. 1988).

Consideration for the suite of elements chosen for each type of mineralization included personal communication with R. Sage (OGS, 2001), F. Breaks (OGS, 2001), C. Blackburn (OGS, 1994), J. Parker (OGS, 2001) and C. Kaszycki (Manitoba Energy and Mines, 1996).

ORIENTATION SURVEYS

Cameco Gold Inc., Empress Hill Property

A geochemical summary of the 5 humus, till "B" and "C" horizon samples collected at the Empress Hill property is presented in Table 4. Samples were collected in a down ice direction (northeast to southwest, at a spacing of 200 m) in close proximity to trenches exposing sericite schist. The sericite schist is thought to be the host rock for local gold mineralization. Heavy mineral data for the till samples collected in the summer of 2000 were not available at time of publication.

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus	Gold	ICP-PGE	1.0 ppb	96.91	0.50	25.36	17.40	81.10
(5 Samples)	Arsenic	INAA	0.5 ppm	33.00	3.00	14.80	18.00	30.00
Till "B"	Gold	ICP-PGE	1.0 ppb	488.00	1.60	100.09	6.73	391.75
(5 Samples)	Arsenic	INAA	0.5 ppm	289.00	4.20	63.66	10.70	233.34
Till "C"	Gold	ICP-PGE	1.0 ppb	216.80	2.23	48.57	10.50	175.54
(5 Samples)	Arsenic	INAA	0.5 ppm	290.00	4.80	73.14	57.80	243.56

ICP-PGE: Inductively Coupled Plasma- Atomic Emission Spectroscopy, Platinum Group Elements
INAA: Instrumental Neutron Activation Analysis

Table 4. Geochemical summary for the Cameco Gold Inc., Empress Hill gold property.

One till sample (488-Tm-99) contained an anomalous number of pristine gold grains (1093 grains; Morris, Sage et al. 2000) and was collected up ice of a modern alluvium sample that also contained an anomalous number of gold grains (389 grains; Morris, Sage et al. 2000). This till sample has high gold values within the till "B" (488 ppb, 486-Tb-99; Morris 2001, Appendix D) and till "C" (216.8 ppb, 487-Tc-99; Morris 2001, Appendix D) horizons. Two hundred meters farther down ice, a humus sample, 453-Th-00, returned a high geochemical gold value (96.91 ppb; Morris 2001, Appendix D). The next farthest sample has high arsenic values in the humus, till "B" and "C" horizons (478-Th-99, 33 ppm; 479-Tb-99, 289 ppm; and 480-Tc-99, 290 ppm; Morris 2001, Appendix D).

Major General Resources Ltd., Spider Lake Base Metal Property

A geochemical summary of the 8 humus, till "B" and "C" horizon samples collected on this property is presented in Table 5. Samples were collected 200 m apart, perpendicular to ice flow and over a felsic stringer sulphide in bedrock thought to host base metal mineralization.

Of the 8 sample sites, 4 returned an anomalous number of pyrite grains (250 grains, 430-Tm-99; 750 grains, 435-Tm-99; 1200 grains, 442-Tm-99; and 2500 grains, 447-Tm-99), one an anomalous number of chromite grains (1847 grains, 452-Tm-99 and a third with an anomalous number of Cr-diopside grains (17 grains, 462-Tm-99, Morris et al. 2000) in the till matrix.

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus (8 samples)	Co	ICP-MS	0.05 ppm	16.12	0.62	4.60	4.76	14.80
	Cu	ICP-MS	0.5 ppm	40.70	6.00	17.66	21.08	39.27
	Ni	ICP-MS	0.5 ppm	20.10	3.20	8.25	9.00	17.06
	Pb	ICP-MS	0.05 ppm	148.19	31.32	90.08	136.46	147.40
	Zn	ICP-MS	1 ppm	145.00	67.00	110.13	129.25	143.95
Till "B" (8 samples)	Co	ICP-MS	0.05 ppm	14.72	1.81	7.45	10.97	13.91
	Cu	ICP-MS	0.5 ppm	35.80	4.40	13.20	15.73	30.38
	Ni	ICP-MS	0.5 ppm	27.60	7.00	16.00	22.70	26.10
	Pb	ICP-MS	0.05 ppm	13.89	7.36	11.15	13.58	13.81
	Zn	ICP-MS	1 ppm	142.00	20.00	84.63	119.00	135.00
Till "C" (8 samples)	Co	ICP-MS	0.05 ppm	36.78	2.41	12.34	15.02	30.71
	Cu	ICP-MS	0.5 ppm	36.20	5.80	15.51	20.35	34.17
	Ni	ICP-MS	0.5 ppm	41.70	7.40	20.14	27.10	38.27
	Pb	ICP-MS	0.05 ppm	13.91	4.84	9.40	10.68	13.78
	Zn	ICP-MS	1 ppm	224.00	24.00	107.50	137.00	204.05

ICP-MS: Inductively Coupled Plasma-Multi-Element Analysis

Table 5. Geochemical summary for the Major General Resources Ltd., Spider Lake, base metal property.

Prairie Lake Carbonatite

Samples at this site were collected, 200 m apart, in the down ice direction (northeast to southwest) over the Prairie Lake Carbonatite. A geochemical summary of the 4 samples of humus, till "B" and "C" horizon material collected, is presented in Table 6.

Of the 4 till matrix samples collected (Morris et al. 2000), one returned anomalous numbers of perovskite grains (1103 grains, 403-Tm-99) and the other, Nb-perovskite grains (627 grains, 388-Tm-99, Morris et al. 2000). A fourth sample, collected farthest down ice across the carbonatite, had the highest number of anomalous geochemical values in the humus, till "B" and "C" horizons related to rare earth carbonatite (Morris 2001, Appendix D).

The lower rare earth carbonatite geochemical values associated with the first 3 samples may reflect the distance required to dilute the geochemical signature associated with material transported onto the carbonatite from up ice.

Slate Islands

Gold mineralization and diatreme intrusions are known to exist on the Slate Islands (Sage 1991b). Obtaining till samples from these islands proved difficult as all of the islands occur below the highest known glacial and post-glacial lake elevations associated with the Superior basin. As the lake levels regressed, till was washed and reworked from most of the islands' bedrock surface. Nonetheless, a till was sampled from the southwest end of Mortimer Island, over massive basalt to andesite rock (1255-Th-00, 1256-Tb-00, and 1257-Tc-99) and the southeast end of Patterson Island (328-Th-00, 329-Tb-00, 330-Tc-00) where gold mineralization is present (Schnieders et al. 1996). Heavy mineral data were not available for these 2 sample sites at the time of publication.

The humus geochemical values for both sample sites do not have elevated gold (Au, As) or base metal-related (Co, Cu, Ni, Pb, Zn) values. The till "B" horizon from sample 1256-Tb-00 has an elevated geochemical value of arsenic (86.1 ppm; Morris 2001, Appendix D), but not for gold. This same sample has elevated values in cobalt (38.43 ppm) and copper (188.4 ppm; Morris 2001, Appendix D). The till "C" horizon sample from 1257-Tc-00 has an elevated value of arsenic (122 ppm), but not gold (Morris 2001, Appendix D). This same sample has elevated values for cobalt (53.9 ppm), copper (187.09 ppm), nickel (42.44 ppm) and lead (29.52 ppm; Morris 2001, Appendix D). Sample 330-Tc-00 has elevated geochemical values of copper (90.63 ppm) and nickel (75.63 ppm; Morris 2001, Appendix D).

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus (4 samples)	Be	ICP-MS	0.1 ppm	8.50	0.50	2.48	3.10	7.42
	Cs	INAA	0.5 ppm	2.20	1.30	1.78	1.90	2.14
	Hf	INAA	0.5 ppm	11.00	4.10	6.88	7.40	10.28
	Li	ICP-MS	0.5 ppm	6.20	0.60	2.93	4.18	5.80
	Rb	INAA	20 ppm	120.00	30.00	59.25	64.50	108.90
	Sc	ICP-MS	0.1 ppm	2.20	0.20	0.90	1.00	1.96
	Ta	INAA	0.5 ppm	9.90	0.60	3.93	4.73	8.87
	Th	INAA	0.5 ppm	10.00	3.50	7.83	9.85	9.97
	U	INAA	0.1 ppm	13.00	0.80	5.38	6.25	11.65
	La	INAA	0.1 ppm	120.00	14.00	64.00	96.75	115.35
	Ce	INAA	1 ppm	280.00	26.00	133.00	190.00	262.00
	Eu	INAA	0.2 ppm	7.30	0.40	3.23	4.90	6.82
	Sm	INAA	0.1 ppm	23.00	2.00	10.60	15.50	21.50
	Tb	INAA	0.2 ppm	2.70	0.25	1.19	1.80	2.52
	Lu	INAA	0.1 ppm	0.30	0.10	0.23	0.30	0.30
Till "B" (4 samples)	Be	ICP-AES	0.1 ppm	13.30	0.30	4.30	5.73	11.79
	Cs	INAA	1 ppm	3.00	1.00	2.25	3.00	3.00
	Hf	INAA	1 ppm	22.00	5.00	14.50	18.25	21.25
	Li	ICP-MS	0.5 ppm	14.40	9.50	12.38	13.73	14.27
	Rb	INAA	15 ppm	143.00	21.00	96.50	130.25	140.45
	Sc	ICP-MS	0.1 ppm	3.60	1.60	2.15	2.25	3.33
	Ta	INAA	0.5 ppm	21.40	0.50	6.35	6.70	18.46
	Th	INAA	0.2 ppm	18.60	5.70	9.83	11.63	17.21
	U	INAA	0.5 ppm	39.30	1.80	11.43	11.70	33.78
	La	INAA	0.5 ppm	185.00	26.00	71.23	75.58	163.12
	Ce	INAA	3 ppm	480.00	48.00	165.50	171.00	418.20
	Eu	INAA	0.2 ppm	9.00	1.00	3.23	3.38	7.88
	Sm	INAA	0.1 ppm	32.20	4.10	11.95	12.40	28.24
	Tb	INAA	0.5 ppm	2.80	0.25	0.98	1.15	2.47
	Lu	INAA	0.05 ppm	0.42	0.14	0.29	0.35	0.41

Table 6. Geochemical summary for till samples collected over the Prairie Lake Carbonatite.

REGIONAL SURVEYS

The suites of elements that define the different types of mineralization have some elements that overlap various suites. For example, nickel is used in the kimberlite, VMS and MS geochemical suites. When choosing priority sites for the different types of mineralization, those samples with as wide a variety of anomalous geochemical values were chosen. Despite this, however, some sites have very strong geochemical signatures for more than one mineralization or rock type. For example, sample 1237-Tb-00 is regarded as having an excellent geochemical signature for kimberlite as it consists of

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Till "C" (4 samples)	Be	ICP-AES	0.1 ppm	36.60	0.60	11.43	13.20	31.92
	Cs	INAA	1 ppm	4.00	1.00	2.50	3.25	3.85
	Hf	INAA	1 ppm	10.00	6.00	8.00	9.25	9.85
	Li	ICP-MS	0.5 ppm	18.10	13.50	15.83	17.58	18.00
	Rb	INAA	15 ppm	181.00	15.00	80.25	111.25	167.05
	Sc	ICP-MS	0.1 ppm	4.40	2.40	3.10	3.43	4.21
	Ta	INAA	0.5 ppm	20.00	0.50	7.63	12.13	18.43
	Th	INAA	0.2 ppm	36.70	7.50	19.45	25.23	34.41
	U	INAA	0.5 ppm	34.10	2.70	13.20	17.90	30.86
	La	INAA	0.5 ppm	312.00	32.60	171.18	261.00	301.80
	Ce	INAA	3 ppm	569.00	74.00	329.50	496.25	554.45
	Eu	INAA	0.2 ppm	12.10	1.70	6.85	10.68	11.82
	Sm	INAA	0.1 ppm	43.90	5.70	24.98	38.88	42.90
	Tb	INAA	0.5 ppm	2.60	0.50	1.63	2.30	2.54
	Lu	INAA	0.05 ppm	0.59	0.23	0.35	0.40	0.55

Table 6. (Continued)

anomalous values of not only nickel, but also chromite, titanium, magnesium, cobalt, vanadium, copper and barium. This same sample also has an excellent geochemical signature for MS mineralization (anomalous values of cobalt, copper, nickel, platinum, palladium).

Therefore, other available data were considered. For example, lake sediment geochemistry has recently been published for the area (Dyer 1997, Ontario Geological Survey 2000a). A lake sediment sample with a similar suite of anomalous geochemical values as those for a nearby till sample site would suggest the presence of a specific type of mineralization or rock type. In addition, the presence and type of any nearby known mineral occurrences were considered (Schnieders et al. 1996). Where possible, an anomalous till geochemical value was compared to its heavy mineral composition and to the heavy mineral composition of any nearby stream sediment sample(s). This could only be done with the 1999 data (Morris et al. 2000) as the 2000 data set was not available at the time of publication. Bedrock information such as the presence of fault systems, bedrock contacts or geophysical signatures were also considered.

Despite this, the exploration targets discussed here simply represent a guide to areas within the Schreiber-Killala Lake region that may be of interest to the exploration geologist. The till samples collected during the regional survey were from terranes having a thin drift cover. Therefore, the bedrock associated with a sampie site with overburden materials providing a wide number of elements with anomalous values, suggesting different types of mineralization or rock types should be reasonably accessible for study.

Gold

Gold and arsenic geochemical values derived from the till samples collected at the Cameco Gold Inc., Empress Hill gold property, define anomalous values associated with gold mineralization (Table 4). On average, the anomalous gold and arsenic values, as defined by the regional geochemical values, fall below those defined by the orientation survey (*compare* Tables 4 and 7). All gold and arsenic values derived from the regional till "B" and "C" samples fall below those anomalous values derived from the orientation survey (*compare* Tables 4 and 8). For humus, only 2 samples (169-Th-00, 234-Th-00; Figure 3) have gold values exceeding those defined as anomalous for gold at the Cameco Gold Inc. orientation survey (*compare* Tables 4 and 8).

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus	Gold	ICP-PGE	1 ppb	61.49	0.5	3.18	3.18	6.33
(118 Samples)	Arsenic	INAA	1 ppm	14	1	4.67	5.75	9.15
Till "B"	Gold	ICP-PGE	1 ppb	21.8	0.5	2.19	2.40	5.39
(113 Samples)	Arsenic	INAA	0.5 ppm	14.9	0.25	3.94	3.60	9.02
Till "C"	Gold	ICP-PGE	1 ppb	39.66	0.5	2.46	1.70	8.95
(116 Samples)	Arsenic	INAA	0.5 ppm	17.3	0.25	3.49	3.68	8.48

ICP-PGE: Inductively Coupled Plasma- Atomic Emission Spectroscopy, Platinum Group

INAA: Instrumental Neutron Activation Analysis

Table 7: Geochemical summary of regional till, gold and arsenic values.

The lower gold and arsenic values derived from the regional survey, therefore, fail to define any outstanding gold exploration target. This concurs with gold grain data derived from the till and modern alluvium sampling program for the eastern part of the study area (Morris et al. 2000). The proportional dot diagram presented in Figure 3, highlights those sites with samples that have more than one anomalous gold and/or arsenic values as determined from the regional data base. The sites are ranked based on the number of anomalous geochemical values derived from a sample site (*see* Data Processing).

Gold and arsenic values derived from the regional data are reported here as being only of moderate interest to gold exploration. However, it is worth noting that several site locations occur within areas where anomalous lake sediment geochemical values (Dyer

List of samples with anomalous values.

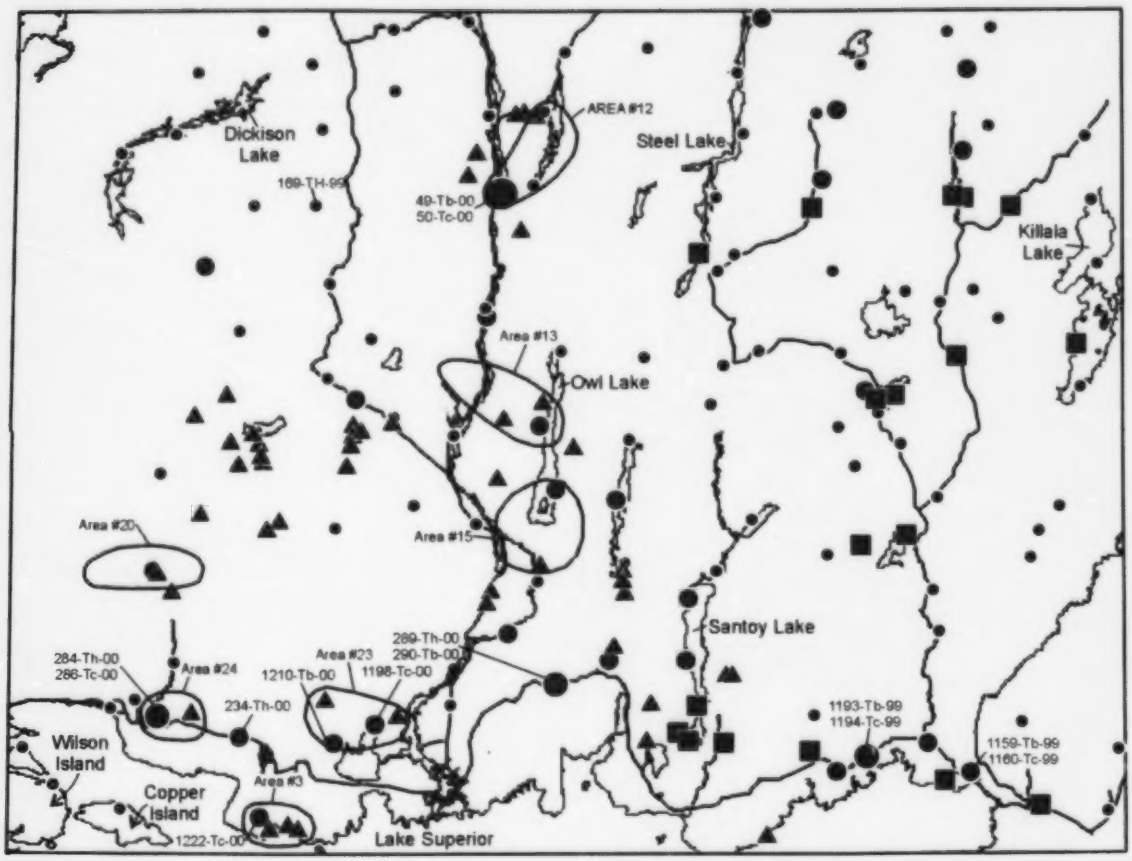
Sample	UTM		Au	As
	Easting	Northing	(ppb)	(ppm)
85-Th-99	526068	5451425	3	**11**
92-Tb-99	507951	5412405	2.6	**9.5**
97-Tb-99	508075	5416353	0.5	**10.3**
116-Th-99	525856	5445906	3.2	**14**
282-Th-99	512739	5454557	6	**10**
366-Tc-99	502993	5412130	**9.1**	3
496-Tc-99	519421	5429926	**23.6**	4.2
1032-Tc-99	517513	5448480	**21.2**	2.4
1051-Th-99	516595	5443913	4.2	**11**
1080-Th-99	528952	5442048	**6.5**	3
1159-Tb-99	526340	5404646	0.86	**13.3**
1160-Tc-99	526340	5404646	1.3	**17.3**
1164-Tb-99	523725	5406715	0.5	**12.4**
1193-Tb-99	519800	5405814	4.45	**14.9**
1194-Tc-99	519800	5405814	8.9	**13.3**
1229-Tb-99	503362	5422726	**5.54**	0.25
1252-Tc-99	517684	5404889	3.8	**13**
49-Tb-00	495804	5442936	**17.97**	**13.9**
50-Tc-00	495804	5442936	1.7	**10.8**
81-Tc-00	494798	5434715	6.34	**11.5**
114-Tb-00	486233	5429330	**8.94**	3.8
169-Th-00	479541	5442098	**61.49**	5
234-Th-00	478680	5407209	**23.98**	5
250-Th-00	498367	5427658	3.35	**13**
263-Th-00	499489	5423446	3.75	**12**
279-Th-00	472848	5418069	**9.37**	2
284-Th-00	473301	5408515	**11.26**	2
286-Tc-00	473301	5408515	**12.7**	2
289-Th-00	499575	5410531	**6.91**	7
290-Tb-00	499575	5410531	**21.80**	3.3
295-Tb-00	473228	5424462	**6.55**	4.1
1185-Tc-00	496271	5413982	**39.7**	3.3
1198-Tc-00	487606	5407888	**12.7**	7.7
1222-Tc-00	480040	5401911	7.31	**11.3**
1210-Tb-00	484966	5406754	**6.09**	5.2

Sample sites with more than one geochemical anomaly associated with gold mineralization.

Sample	UTM		Au	As
	Easting	Northing	(ppb)	(ppm)
1159-Tb-99	526340	5404646	0.86	**13.3**
1160-Tc-99	526340	5404646	1.3	**17.3**
1193-Tb-99	519800	5405814	4.45	**14.9**
1194-Tc-99	519800	5405814	8.9	**13.3**
49-Tb-00	495804	5442936	**17.97**	**13.9**
50-Tc-00	495804	5442936	1.7	**10.8**
284-Th-00	473301	5408515	**11.3**	2
286-Tc-00	473301	5408515	**12.7**	2
289-Th-00	499575	5410531	**6.91**	7
290-Tb-00	499575	5410531	**21.80**	3.3

Table 8. Anomalous gold and arsenic values determined from the regional data. Anomalous values are highlighted. Sample site locations are positioned on Figure 3.

1997, Table 9, Figure 3) and/or till or modern alluvium heavy mineral values (Morris et al. 2000, Figure 3) occur. In addition, several samples with anomalous gold and arsenic geochemical values were collected close to bedrock contacts and 2 in close proximity to known gold mineralization (Table 9).



• 0 ▲ Site with an anomalous lake sediment gold geochemical signature (after Dyer 1997).

● 1 ■ Site with a moderate till or modern alluvium heavy mineral signature for gold (after Morris et al. 2000).

● 2

● 3 Area #3 Anomalous lake sediment area (after Dyer 1997).

Site Rank

Figure 3. Proportional dot diagram illustrating the location of till sample sites with moderate gold and arsenic geochemical values. The site ranking on which the diagram is based was determined from the number of anomalous values for gold and arsenic derived from the humus, till "B" and "C" horizons. For example, sample 49-Tb-00 has anomalous values of gold and arsenic and sample 50-Tc-00 has an anomalous arsenic value. The site from which these 2 samples were collected is given a rank of 3. Anomalous values are determined from the regional data. The areas circled on the diagram were defined by lake sediment geochemistry (Dyer 1997) and summarized in Table 9.

Sample (s)	Proposed Gold Exploration Area	Reported Gold Mineralization
250-Th-00	Aquasabon Lake area Area # 13 (Ontario Geological Survey, 2000)	No
1222-Tc-00	Worthington Bay area- High priority area Area # 3 (Dyer 1997)	Yes
1210-Tb-00 1198-Tc-00	Hays Lake-Power Line area- Medium priority area Area # 23 (Dyer 1997)	No
284-Th-00, 286-Tc-00	Rongie Lake area- Medium priority area Area # 24 (Dyer 1997)	No
279-Th-00	Ambrose Lake area- Medium priority area Area # 20 (Dyer 1997)	Yes
263-Th-99	Owl Creek area- High priority area Area # 15 (Dyer 1997)	No
49-Tb-00, 50 Tc-00	Catalonite Lake area- High priority area Area # 12 (Dyer 1997)	No

Table 9. Sites associated with areas as having potential for gold mineralization. The areas are defined from a lake sediment geochemical survey (Dyer 1997) and the locations are positioned on Figure 3. Mineral occurrence locations were determined from Schnieders et al. (1996).

Of further interest are 2 samples from 2 different sites north of Hays Lake (1210-Tb-00, 1198-Tc-00; Figure 3) with anomalous gold values. These sites occur up ice from a gravel pit reported to have high gold grain values (Smyk and Schnieders 1995). Heavy mineral data derived from surrounding till and stream sediment samples, as well as from material collected from the pit itself, will determine if the anomalous gold values from the till samples are in fact locally significant.

Kimberlite

A summary of elements associated with kimberlite and related statistics derived from the regional data base are presented in Table 10. There are a number of samples from individual sites that have a single anomalous geochemical value associated with the kimberlite geochemical suite. These are listed in Table 11 but are not considered important targets for kimberlite exploration. There are, however, 9 sites with very good geochemical signatures for kimberlite (Table 11, Figure 4). Two of these sites were identified from the 1999 till sampling program as being good kimberlite exploration targets. Both are located within close proximity to modern alluvium sample sites that have very good heavy mineral signatures for kimberlite (Figure 4; Morris et al. 2000).

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus (118 Samples)	Chromium	ICP-MS	1 ppm	86.84	3.76	14.76	14.00	40.52
	Nickel	ICP-MS	0.5 ppm	42.62	2.2	10.1	11.73	21.89
	Titanium	ICP-MS	10 ppm	15	5	5.19	5.00	5
	Magnesium	ICP-MS	10 ppm	6428.05	5	1617.25	1637.00	4758.4
	Cobalt	ICP-MS	0.05 ppm	41.42	0.25	3.63	4.03	11.5
	Vanadium	ICP-MS	10 ppm	95	5	25.91	63.75	72.15
	Copper	ICP-MS	0.5 ppm	137.33	4	15.7	14.00	45.27
	Strontium	INAA	100 ppm	330	50	130.34	207.50	281.5
	Barium	ICP-MS	1 ppm	537	0.5	129.03	157.75	304.41
Till "B" (113 Samples)	Chromium	ICP-MS	1.0 ppm	177.14	0.5	40.91	41.50	102.37
	Nickel	ICP-MS	0.5 ppm	247.69	0.25	19.58	20.28	47.66
	Titanium	ICP-AES	3.0 ppm	3312	1.5	1128.15	1381.25	2266
	Magnesium	ICP-MS	10.0 ppm	47273.8	5	3871.39	3264.75	7493.2
	Cobalt	ICP-MS	0.05 ppm	57.43	0.025	7.16	6.55	16.87
	Vanadium	ICP-AES	5.0 ppm	282	2.5	54.35	53.75	109.2
	Copper	ICP-MS	0.5 ppm	136.44	0.25	15.15	12.68	36.47
	Strontium	INAA	0.05%	0.08	0.25	0.03	0.03	0.03
	Barium	ICP-AES	1.0 ppm	156.1	0.5	46.99	64.25	103.71
Till "C" (116 Samples)	Chromium	ICP-MS	1.0 ppm	600	0.5	50.45	54.50	98.64
	Nickel	ICP-MS	0.5 ppm	390.72	0.25	25.04	21.65	57.18
	Titanium	ICP-AES	3.0 ppm	3310	1.5	1018.62	1103.00	2218.75
	Magnesium	ICP-MS	10.0 ppm	100000	5	5818.59	6252.75	12008.2
	Cobalt	ICP-MS	0.05 ppm	58.91	0.025	8.71	7.53	21.41
	Vanadium	ICP-AES	5.0 ppm	270	2.5	46.69	46.75	104.25
	Copper	ICP-MS	0.5 ppm	265.64	0.25	20.19	13.30	55.44
	Strontium	INAA	0.05%	0.09	0.03	0.03	0.03	0.03
	Barium	ICP-AES	1.0 ppm	242.3	0.5	46.52	47.75	122.59

ICP-AES:Inductively Coupled Plasma- Atomic Emission Spectroscopy

ICP-MS: Inductively Coupled Plasma-Multi-Element Analysis

INAA: Instrumental Neutron Activation Analysis

Table 10. Summary of regional geochemical values associated with kimberlite.

Sample	Cr	Ni	Ti	Mg	Co	V	Cu	Sr	Ba
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
3-Th-99	37	18.3	5	2568	**12.64**	**76**	**46.8**	160	84
12-Th-99	14	4.1	5	1460	2.12	57	4.5	**290**	120
22-Tb-99	25	15	798	2362	6.34	35	6.6	**0.05**	66
40-Tb-99	**114**	**69.1**	2147	**9297**	**17.64**	91	32.5	0.025	**120**
41-Tc-99	**161**	**83.2**	**2646**	**13572**	21.14	102	48.9	0.025	**204**
57-Tc-99	29	17.4	813	**22979**	5.65	32	13.5	0.025	34
66-Th-99	**46**	**29.7**	**11**	1598	5.3	64	19.2	210	228
74-Th-99	25	12.2	5	1068	3.36	**73**	13.5	150	137
79-Th-99	21	10.9	5	1501	3.07	**95**	8.2	150	67
85-Th-99	12	7.4	5	1290	3.97	**78**	11.3	50	165
87-Tc-99	**600**	43.5	634	**100000**	11.59	27	44.7	0.025	64
97-Tb-99	**120**	43.6	1.5	6507	**39.91**	2.5	18.2	0.025	99
131-Th-99	11	6.9	5	1813	2.14	**78**	10.6	210	168
155-Th-99	32	12	**11**	2969	4.46	**92**	7.6	280	58
165-Tb-99	19	9.4	801	2193	3.24	27	6.5	**0.08**	24
209-Th-99	11	7.4	5	1805	1.46	58	15.8	50	**404**
210-Tb-99	23	12.3	525	2279	4.15	34	4.2	0.025	**111**
214-Th-99	25	18.4	**15**	**5499**	5.19	65	15.2	160	202
215-Tb-99	64	**49**	**3166**	**26609**	**25.59**	**115**	23.5	0.025	**132**
216-Tc-99	87	**63.4**	**3310**	**32826**	**34.31**	**142**	34.3	0.025	**131**
223-Th-99	13	16.3	5	1688	**12.27**	56	11.2	190	176
224-Tb-99	35	29.6	1024	3263	10.54	52	11	**0.05**	64
300-Th-99	10	4.6	5	281	1.57	15	6.3	**330**	68
325-Th-99	6	15.5	5	313	3.55	5	22.5	160	**320**
365-Tb-99	40	15.6	**3312**	7007	7.67	**135**	10.8	0.025	45
366-Tc-99	49	23.6	**2273**	8255	11.89	97	21.6	0.025	48
494-Th-99	5	3.5	5	986	1.57	5	7.7	260	**537**
495-Tb-99	20	8.5	732	1891	3.78	39	3.5	0.025	**144**
1035-Th-99	12	10.2	5	1897	4.4	5	16.5	200	**452**
1335-Th-99	6	5.6	5	999	1.65	5	7.8	230	**320**
1193-Tb-99	**111**	21.6	1436	1308	6.24	**111**	**45.3**	0.025	69

Table 11. Summary list of samples with anomalous values of elements associated with kimberlite. Anomalous values were determined from the regional data set. Anomalous values are highlighted.

Sample	Cr	Ni	Ti	Mg	Co	V	Cu	Sr	Ba
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
1164-Tb-99	**153**	**50.2**	1686	**8038**	16.35	**127**	30.3	0.025	71
1165-Tc-99	55	**81.1**	1854	4328	**30.79**	**148**	0.25	0.025	92
1229-Tb-99	35	26.5	749	3184	9.47	31	31.7	**0.06**	29
8-Th-00	**58.79**	26.48	5	**4908.86**	**14.78**	63.3	15.51	240	128.05
48-Th-00	**44.21**	18.59	5	4731.85	7.41	43.8	11.46	270	137.28
50-Tc-00	64.8	49.97	1355	6857.99	13.85	50	33.3	**0.05**	57.01
84-Th-00	40.45	**30.21**	5	3839.51	**19.05**	38.2	**85.51**	50	95.04
85-Tb-00	57.08	46.84	773	3566.16	**25.1**	65	**135.81**	0.025	94.9
86-Tc-00	66.19	46.44	753	4895.83	20.99	59	**100.35**	0.025	78.92
113-Th-00	**50.68**	**27.89**	5	**6144.01**	11.36	50.2	37.38	260	59.39
114-Tb-00	57.99	33.67	1451	5412.91	12.09	65	**46.67**	0.025	47.17
115-Tc-00	52.73	29.42	1225	4485.51	11.56	56	40.4	**0.05**	47.45
171-Tc-00	35.56	17.74	814	3163.61	6.87	28	14.01	**0.08**	22.98
219-Tc-00	36.48	24.83	978	4557.51	13.2	47	40.22	**0.05**	19.15
234-Th-00	18.14	15.34	5	2958.15	5.7	23.4	33.08	**310**	64.27
245-Tc-00	50.75	37.17	1492	7162.91	16.66	48	37.93	**0.09**	89.85
250-Th-00	**86.84**	**42.62**	5	**5220.78**	8.6	27.9	26.93	**310**	**471.66**
251-Tb-00	70.52	25.11	**2986**	4756.94	9.02	103	34.99	0.025	48.59
252-Tc-00	**109.6**	51.3	**2906**	8156.88	15.8	77	**91.11**	0.025	62.53
264-Tb-00	29.6	24.22	**2317**	5163.3	11.88	65	27.41	0.025	76.51
265-Tc-00	29.85	24.12	**2233**	6135.3	11.54	53	38.73	0.025	66.01
274-Th-00	16.42	9.73	5	2698.34	3.33	11.9	**65.27**	200	85.11
279-Th-00	18.51	14.92	5	3412.29	5.67	12	**70.08**	50	83.58
284-Th-00	30.08	19.98	5	**6428.05**	7.63	26.3	**137.33**	50	80.52
291-Tc-00	36.45	18.1	1253	4228.56	7.57	56	7.19	**0.06**	76.67
303-Tc-00	23.37	8.04	991	2549.02	3.07	54	6.33	**0.05**	23.12
370-Tb-00	81.56	**56.49**	1692	**24738.1**	**32.48**	**282**	**38.69**	0.025	**156.1**
371-Tc-00	86.91	**67.07**	1422	**29655.1**	**42.45**	**230**	**75.81**	0.025	**150.68**
430-Th-00	36.34	**27.16**	5	3630.8	**41.42**	23.2	18.5	140	94.95
431-Tb-00	**102.9**	**48.89**	**2305**	**10088.9**	15.82	90	26.2	0.025	43.16
444-Th-00	21.42	19.96	5	2538.32	**13.4**	10.1	**67.97**	130	94.01
1002-Th-00	15.66	10.28	5	1354.58	2.47	27.7	12.63	**290**	76.04
1025-Tc-00	**126.1**	54.09	2214	10368.1	**23.94**	**111**	30.27	**0.06**	110.2

Table 11. (Continued)

Sample	Cr (ppm)	Ni (ppm)	Ti (ppm)	Mg (ppm)	Co (ppm)	V (ppm)	Cu (ppm)	Sr (ppm)	Ba (ppm)
1048-Th-00	**40.93**	**21.08**	5	**5177.52**	7.27	45	17.24	110	72.62
1069-Tc-00	**166.5**	**68.28**	**2269**	**18304.9**	**22.2**	**131**	**73.33**	0.025	**124.37**
1197-Tb-00	43.01	14.21	1111	2027.42	8.48	89	**40.89**	0.025	53.88
1198-Tc-00	67.27	29.83	907	4880.82	12.48	59	**100.94**	0.025	25.86
1237-Tb-00	**177.1**	**247.69**	**2476**	**47273.8**	**57.43**	**205**	**136.44**	0.025	**104.78**
1238-Tc-00	**249.5**	**390.72**	1051	**>100000**	**58.91**	**270**	**265.64**	0.025	**138.22**
1243-Tc-00	28.04	21.65	25	6324.82	5.66	19	20.29	0.025	**242.3**
Priority Kimberlite Geochemical Exploration Targets									
40-Tb-99	**114**	**69.1**	2147	**9297**	**17.64**	91	32.5	0.025	**120**
41-Tc-99	**161**	**83.2**	**2646**	**13572**	21.14	102	48.9	0.025	**204**
214-Th-99	25	18.4	**15**	**5499**	5.19	65	15.2	160	202
215-Tb-99	64	**49**	**3166**	**26609**	**25.59**	**115**	23.5	0.025	**132**
216-Tc-99	87	**63.4**	**3310**	**32826**	**34.31**	**142**	34.3	0.025	**131**
1164-Tb-99	**153**	**50.2**	1686	**8038**	16.35	**127**	30.3	0.025	71
1165-Tc-99	55	**81.1**	1854	4328	**30.79**	**148**	0.25	0.025	92
84-Th-00	40.45	**30.21**	5	3839.51	**19.05**	38.2	**85.51**	50	95.04
85-Tb-00	57.08	46.84	773	3566.16	**25.1**	65	**135.81**	0.025	94.9
86-Tc-00	66.19	46.44	753	4895.83	20.99	59	**100.35**	0.025	78.92
250-Th-00	**86.84**	**42.62**	5	**5220.78**	8.6	27.9	26.93	**310**	**471.66**
251-Tb-00	70.52	25.11	**2986**	4756.94	9.02	103	34.99	0.025	48.59
252-Tc-00	**109.6**	51.3	**2906**	8156.88	15.8	77	**91.11**	0.025	62.53
370-Tb-00	81.56	**56.49**	1692	**24738.1**	**32.48**	**282**	**38.69**	0.025	**156.1**
371-Tc-00	86.91	**67.07**	1422	**29655.1**	**42.45**	**230**	**75.81**	0.025	**150.68**
430-Th-00	36.34	**27.16**	5	3630.8	**41.42**	23.2	18.5	140	94.95
431-Tb-00	**102.9**	**48.89**	**2305**	**10088.9**	15.82	90	26.2	0.025	43.16

Table 11. (Continued)

Sample	Cr (ppm)	Ni (ppm)	Ti (ppm)	Mg (ppm)	Co (ppm)	V (ppm)	Cu (ppm)	Sr (ppm)	Ba (ppm)
Priority Kimberlite Geochemical Exploration Targets (Continued)									
1069-Tc-00	**166.5**	**68.28**	**2269**	**18304.9**	**22.2**	**131**	**73.33**	0.025	**124.37**
1237-Tb-00	**177.1**	**247.69**	**2476**	**47273.8**	**57.43**	**205**	**136.44**	0.025	**104.78**
1238-Tc-00	**249.5**	**390.72**	1051	**>100000**	**58.91**	**270**	**265.64**	0.025	**138.22**

Table 11. (Continued)

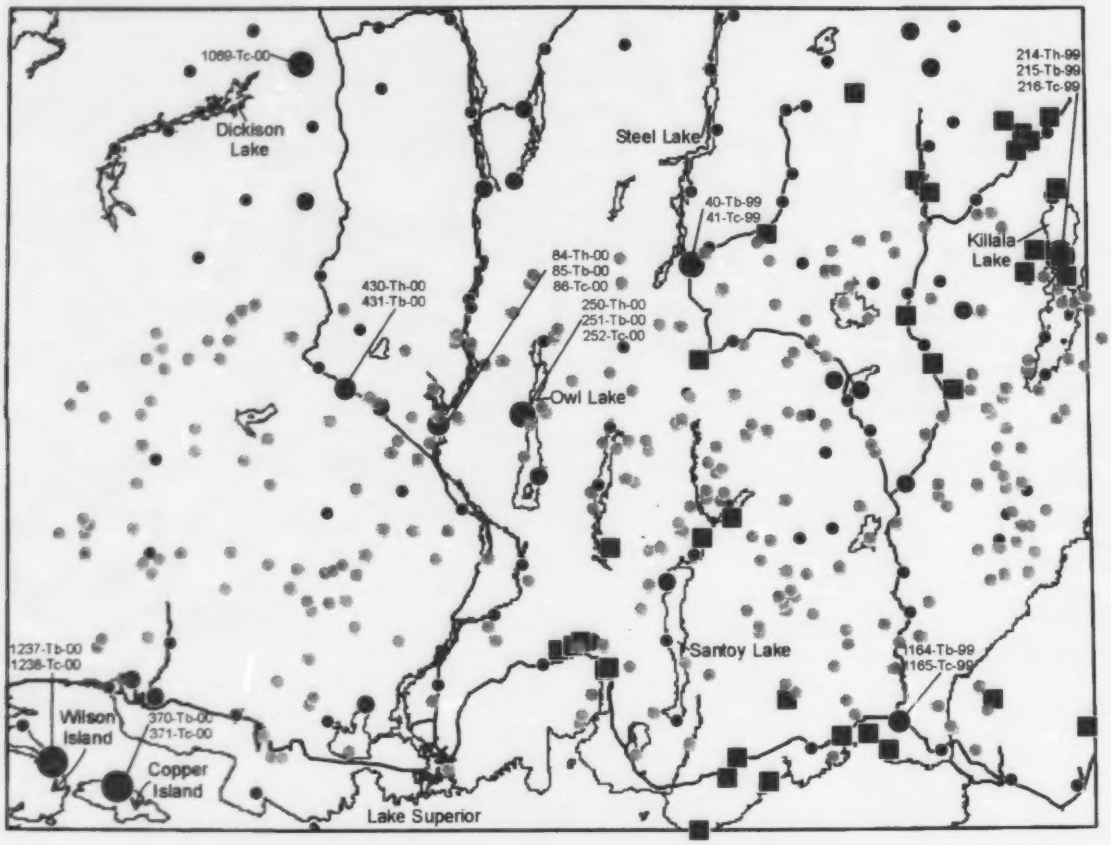
Both sites are also in close proximity to magnetic, circular anomalies (Ontario Geological Survey 2000b; Geological Survey of Canada 1963a).

The third site, consisting of anomalous geochemical values associated with kimberlite in the humus (214-Th-99), the till "B" (215-Tb-99) and till "C" (216-Tc-99) horizons, occurs in close proximity to a modern alluvium site that has an excellent heavy mineral signature for kimberlite (Figure 4, Morris et al. 2000). This site is also in close proximity to a circular, magnetic anomaly (Figure 4, Ontario Geological Survey 2000b). However, this site does occur down ice of a zinc occurrence (Schnieders et al. 1996) and the heavy mineral component of the till has a base metal signature (Morris et al. 2000, *see* Magmatic Sulphide section, this report).

The other 6 sites are defined from geochemical values obtained from till samples collected during the summer of 2000. Except for sample 1069-Tc-00 (which has a very strong kimberlite geochemical signature), all sample sites are located in close proximity to circular magnetic anomalies (Ontario Geological Survey 2000b; Geological Survey of Canada 1963b, 1963c). These geochemical signatures will be compared to heavy mineral signatures from the till and nearby modern alluvium samples when the heavy mineral data become available.

Volcanogenic Massive Sulphide

A summary of the elements associated with VMS sulphide mineralization and related statistics derived from the regional data base are presented in Table 12. When comparing the summary of statistics for the suite of VMS related elements from the Spider Lake orientation survey (Table 5) to the same suite of elements from the regional data (Table 12) it is evident that some of the anomalous values generated from the orientation survey are less than those defined from the regional survey. This alone may help in defining exploration targets for VMS deposits, however, many sample sites consist of only one anomalous element (Table 13). Sample sites with only one anomalous geochemical value are not considered as primary exploration targets for VMS deposits. Many of these single



- ≥1
- 2-4
- 5-7
- 8-10
- ≥11

Site Rank

- Anomalous, circular magnetic signature, as defined by the Ontario Geological Survey (2000b).
- Site with an anomalous till or modern alluvium kimberlite heavy mineral signature (after Morris et al. 2000).

Figure 4. Sample sites with anomalous geochemical kimberlite signatures. Anomalous geochemical signatures are defined from the regional data base. The site ranking on which the diagrams are based was determined from the number of anomalous values within the humus, till "B" and "C" horizons.

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus (118 Samples)	Cobalt	ICP-MS	0.05 ppm	41.42	0.25	3.63	4.03	11.5
	Copper	ICP-MS	0.5 ppm	137.33	4	15.7	14.00	45.27
	Nickel	ICP-MS	0.5 ppm	42.62	2.2	10.1	11.73	21.89
	Lead	ICP-MS	0.05 ppm	149.88	0.03	54.53	2.88	103.05
	Zinc	ICP-MS	1 ppm	1195.27	0.5	100.65	88.00	228.67
Till "B" (113 Samples)	Cobalt	ICP-MS	0.05 ppm	57.43	0.03	7.15	6.55	16.87
	Copper	ICP-MS	0.5 ppm	136.44	0.25	15.15	12.68	36.47
	Nickel	ICP-MS	0.5 ppm	247.69	0.25	19.58	20.28	47.66
	Lead	ICP-MS	0.05 ppm	29.89	0.03	9.11	10.47	18.79
	Zinc	ICP-MS	1 ppm	148.36	0.5	38.1	38.75	92.63
Till "C" (116 Samples)	Cobalt	ICP-MS	0.05 ppm	58.91	0.03	8.71	7.53	21.41
	Copper	ICP-MS	0.5 ppm	265.64	0.25	20.19	13.30	55.44
	Nickel	ICP-MS	0.5 ppm	390.72	0.25	25.04	21.65	57.18
	Lead	ICP-MS	0.05 ppm	51.12	0.03	6.78	7.71	13.98
	Zinc	ICP-MS	1 ppm	140.99	0.5	33.52	29.75	91.17

Table 12. Summary of regional geochemical values associated with volcanogenic sulphide mineralization.

element anomalies consist of an anomalous value from the humus (Table 13). Three of these samples (279-Th-00, 274-Th-00, 284-Th-00; Figure 5) were collected in close proximity to the Winston Lake Road, a road used to transport (by open truck) concentrate from the former Winston Lake mine. As was the case in the Shebandowan area (Bajc 1999), these anomalous copper values likely represent contamination from the haul trucks.

The geochemistry of a number of samples suggesting VMS mineralization were also highlighted as kimberlite exploration targets due to the presence of 3 elements (Co, Cu, Ni) in each of the geochemical suites. Therefore, the potential of these samples indicating either VMS mineralization or kimberlite should not be ignored (samples 1237-Tb-00, 1238-Tc-00; 1069-Tc-00; 370-Tb-00, 371-Tc-00).

Three sample sites from the 1999 till sampling program are cited as VMS exploration targets and all 3 have very weak (from sites associated with sample 97-Tb-99 and 1159-Tb-99, 1160-Tc-99) to weak (site associated with samples 1163-Th-99, 1164-

Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pb (ppm)	Zn (ppm)
3-Th-99	**12.64**	**46.8**	18.3	26.82	46
40-Tb-99	**17.64**	32.5	**69.1**	7.12	68
41-Tc-99	21.14	48.9	**83.2**	8.48	77
66-Th-99	5.3	19.2	**29.7**	75.47	69
87-Tc-99	11.59	44.7	43.5	7.91	**117**
92-Tb-99	2.72	7	8.4	**28.5**	38
93-Tc-99	4.6	11.8	14.5	**24.39**	43
97-Tb-99	**39.91**	18.2	43.6	**29.89**	**94**
209-Th-99	1.46	15.8	7.4	**105.7**	227
210-Tb-99	4.15	4.2	12.3	**23.9**	43
215-Tb-99	**25.59**	23.5	**49**	6.84	78
216-Tc-99	**34.31**	34.3	**63.4**	9.12	63
223-Th-99	**12.27**	11.2	16.3	64.47	47
349-Tc-99	10.44	11.1	25	**15.47**	78
1124-Tb-99	2.86	11.2	7.2	**19.01**	30
1138-Th-99	0.69	12.8	4.8	**106.84**	122
1151-Th-99	1.04	11.1	10.2	**140.38**	102
1159-Tb-99	5.21	12.1	9.6	**27.99**	**117**
1160-Tc-99	6.14	0.25	0.8	**51.12**	**103**
1163-Th-99	1.92	16.1	17.3	**149.88**	123
1164-Tb-99	16.35	30.3	**50.2**	12.76	**128**
1165-Tc-99	**30.79**	0.25	**81.1**	0.025	91
1193-Tb-99	6.24	**45.3**	21.6	14.98	28
8-Th-00	**14.78**	15.51	**26.48**	29.23	75.16
84-Th-00	**19.05**	**85.51**	**30.21**	27.05	54.17
85-Tb-00	**25.1**	**135.81**	46.84	7.28	64.02
86-Tc-00	20.99	**100.35**	46.44	6.3	68.9
113-Th-00	11.36	37.38	**27.89**	17.3	75.34
114-Tb-00	12.09	**46.67**	33.67	11.04	58.43
250-Th-00	8.6	26.93	**42.62**	98.37	**238.12**

Table 13. Summary list of samples with anomalous values of elements associated with volcanogenic massive sulphide mineralization. Values are anomalous based on proportional statistics derived from regional till data. See Tables 2 and 3 for summary of analytical methods used and detection limits for each element listed in this table. Anomalous values are highlighted.

Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pb (ppm)	Zn (ppm)
252-Tc-00	15.8	**91.11**	51.3	**19.57**	53.66
274-Th-00	3.33	**65.27**	9.73	40.47	**743.47**
279-Th-00	5.67	**70.08**	14.92	48.24	**524.55**
284-Th-00	7.63	**137.33**	19.98	24.52	**1195.27**
289-Th-00	1.59	10.2	5.85	**110.02**	51.17
302-Tb-00	2.78	6.64	7.55	**24.15**	24.97
303-Tc-00	3.07	6.33	8.04	**17.44**	22.03
370-Tb-00	**32.48**	**38.69**	**56.49**	5.68	**148.36**
371-Tc-00	**42.45**	**75.81**	**67.07**	8.54	**121.95**
430-Th-00	**41.42**	18.5	**27.16**	31.28	92.51
431-Tb-00	15.82	26.2	**48.89**	9.07	**101.16**
432-Tc-00	10.5	9.58	21.16	9.2	**102.84**
435-Th-00	8.67	15.16	8.8	61.64	**249.48**
436-Tb-00	7.13	31.78	14.66	14.26	**142.44**
437-Tc-00	16.86	35.08	28.81	10.94	**140.99**
444-Th-00	**13.4**	**67.97**	19.96	62.15	**479.8**
1025-Tc-00	**23.94**	30.27	54.09	13.84	59.26
1069-Tc-00	**22.2**	**73.33**	**68.28**	9.23	**91.69**
1139-Tc-00	15.76	25.22	55.1	**14.41**	86.56
1196-Th-00	1.27	13.81	7.36	**133.86**	180.28
1197-Tb-00	8.48	**40.89**	14.21	11.97	68.34
1198-Tc-00	12.48	**100.94**	29.83	10.17	40.45
1237-Tb-00	**57.43**	**136.44**	**247.69**	5.16	82.61
1238-Tc-00	**58.91**	**265.64**	**390.72**	4.14	61.64
Priority Volcanic Massive Sulphide Geochemical Exploration Targets					
97-Tb-99	**39.91**	18.2	43.6	**29.89**	**94**
1159-Tb-99	5.21	12.1	9.6	**27.99**	**117**
1160-Tc-99	6.14	0.25	0.8	**51.12**	**103**

Table 13. (Continued)

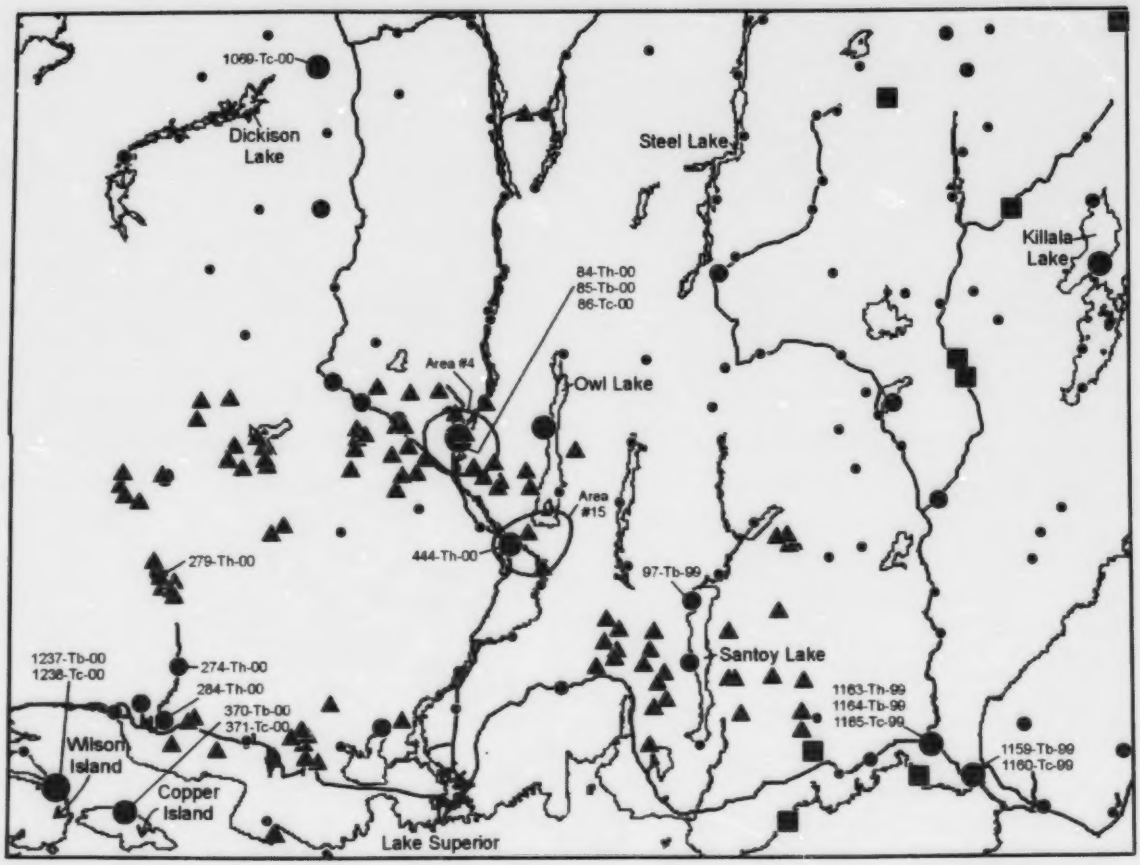
Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pb (ppm)	Zn (ppm)
Priority Volcanic Massive Sulphide Geochemical Exploration Targets (Continued)					
1163-Th-99	1.92	16.1	17.3	**149.88**	123
1164-Tb-99	16.35	30.3	**50.2**	12.76	**128**
1165-Tc-99	**30.79**	0.25	**81.1**	0.025	91
370-Tb-00	**32.48**	**38.69**	**56.49**	5.68	**148.36**
371-Tc-00	**42.45**	**75.81**	**67.07**	8.54	**121.95**
444-Th-00	**13.4**	**67.97**	19.96	62.15	**479.8**
1069-Tc-00	**22.2**	**73.33**	**68.28**	9.23	**91.69**
1237-Tb-00	**57.43**	**136.44**	**247.69**	5.16	82.61
1238-Tc-00	**58.91**	**265.64**	**390.72**	4.14	61.64

Table 13. (Continued)

Tb-99, 1165-Tc-99) base metal heavy mineral signatures (Morris et al. 2000). The sites with samples that have anomalous VMS geochemical values derived from the 2000 till sampling program will be evaluated against the associated till matrix heavy mineral signature when the data become available.

Samples 1163-Th-99, 1164-Tb-99 and 1165-Tc-99 were collected from a site up ice of a modern alluvium sample having a strong base metal heavy mineral signature (Figure 5; Morris et al. 2000). Samples 84-Th-00, 85-Tb-00 and 86-Tc-00 were collected from a site that lies within an area defined as a high priority for gold exploration based on lake sediment geochemistry (area # 4; Dyer 1997; Figure 5). However, lake sediment copper and zinc values for the area were also recognized as anomalous.

Sample 444-Th-00 is located within Dyer's (1997) high priority area number 15, the Owl Creek area. This area includes anomalous lake sediment geochemistry in Bi, Mo, ± Au and ± Pb. In addition, sample 444-Th-00 occurs down ice from a known Mo occurrence (Schnieders et al. 1996) and is located near a contact between felsic intrusive and mafic metavolcanic terranes.



• 0 ▲ Site with an anomalous lake sediment base metal geochemical signature (after Dyer 1997).

● 1

■ Site with an anomalous till or modern alluvium base metal heavy mineral signature (after Morris et al. 2000).

● 2-3

● 4-5

● ≥6 Anomalous lake sediment area (after Dyer 1997).

Site Rank

Figure 5. Sample sites with anomalous geochemical volcanogenic sulphide mineralization signatures. Anomalous geochemical signatures are defined from the regional data base. The site ranking on which the diagram is based was determined from the number of anomalous values within the humus, till "B" and "C" horizons. The areas circled on the diagram are defined by lake sediment geochemistry (Dyer 1997).

Magmatic Sulphide

A summary of the elements associated with MS mineralization and related statistics derived from the regional data base are presented in Table 14. Many of these MS exploration targets overlap with those cited as VMS exploration targets as cobalt, copper and nickel occur in both suites of elements used to define each type of mineralization (Table 15). However, of the exploration targets cited as being high priority for both the VMS and MS mineralization, only 2 sites overlap. These include samples 370-Tb-00 and 370-Tc-00 from Copper Island and 1237-Tb-00 and 1238-Tc-00 from Wilson Island (Figure 6). Also, both sites are cited as interesting kimberlite exploration targets. The heavy mineral composition from the matrix of the 2 till samples, as well as from nearby stream sediment samples, should provide additional information useful in helping to determine the associated rock type or mineralization. Note that a copper occurrence exists immediately up ice from the till sample site on Copper Island (Schnieders et al. 1996). In addition, many of the MS mineralization exploration targets overlap with gold exploration targets as gold is used in the suite of elements used to define each type of mineralization.

Of the other samples cited as being priority targets for MS mineralization, 215-Tb-99 and 216-Tc-99 occur in close proximity to a known zinc occurrence and samples 284-Th-00 and 286-Tc-00 occur down ice from a barite/fluorite occurrence (Schnieders et al. 1996). The heavy mineral composition of the till matrix, associated with samples 215-Tb-99 and 216-Tc-99, consist of chromite, chalcopyrite and low-Cr diopside suggesting a base metal source (Morris et al. 2000).

Samples 234-Th-00, 236-Tc-00 and samples 1197-Tb-00 and 1198-Tc-00 were collected from 2 different sites that fall just outside an area (area # 2, Lamont Lake area, Figure 6) cited as an area anomalous for Pt, Pd and Au in lake sediment (Ontario Geological Survey 2000a).

Recently an area southeast of Foxtrap Lake has been staked for platinum group element (PGE) exploration by McVicar Minerals and BHP Minerals (Northern Miner, January 29th- February 4th issue, 2001). Two sites, each with anomalous humus values of both platinum and palladium (1095-Th-99, 1106-Th-99, Table 15, Figure 6), occur in this area.

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus (118 Samples)	Cobalt	ICP-MS	0.05 ppm	41.42	0.25	3.63	4.03	11.5
	Copper	ICP-MS	0.5 ppm	137.33	4	15.7	14.00	45.27
	Nickel	ICP-MS	0.5 ppm	42.62	2.2	10.1	11.73	21.89
	Platinum	ICP-PGE	0.5 ppb	13.74	0.25	1.23	2.58	3.42
	Palladium	ICP-PGE	1 ppb	5.3	0.5	1.36	2.88	3.84
	Gold	ICP-PGE	1 ppb	61.49	0.5	3.18	3.18	6.33
	Tungsten	ICP-MS	0.05 ppm	0.7	0.03	0.13	0.15	0.32
Till "B" (113 Samples)	Cobalt	ICP-MS	0.05 ppm	57.43	0.03	7.16	6.55	16.87
	Copper	ICP-MS	0.5 ppm	136.44	0.25	15.15	12.68	36.47
	Nickel	ICP-MS	0.5 ppm	247.69	0.25	19.58	20.28	47.66
	Platinum	ICP-PGE	0.5 ppb	13	0.25	0.91	1.12	1.89
	Palladium	ICP-PGE	1 ppb	8.28	0.5	0.72	0.50	2.03
	Gold	ICP-PGE	1 ppb	21.8	0.5	2.19	2.40	5.39
	Tungsten	ICP-MS	0.05 ppm	115	0.03	24.98	53.00	82.4
Till "C" (116 Samples)	Cobalt	ICP-MS	0.05 ppm	58.91	0.03	8.71	7.53	21.41
	Copper	ICP-MS	0.5 ppm	265.64	0.25	20.19	13.30	55.44
	Nickel	ICP-MS	0.5 ppm	390.72	0.25	25.04	21.65	57.18
	Platinum	ICP-PGE	0.5 ppb	17.27	0.25	1.12	1.28	2.4
	Palladium	ICP-PGE	1 ppb	25.27	0.5	0.97	0.50	2.28
	Gold	ICP-PGE	1 ppb	39.66	0.5	2.46	1.70	8.95
	Tungsten	ICP-MS	0.05 ppm	2.42	0.03	0.29	0.24	0.71

ICP-PGE: Inductively Coupled Plasma- Atomic Emission Spectroscopy, Platinum Group

ICP-MS: Inductively Coupled Plasma-Multi-Element Analysis

Table 14. Geochemical summary for elements associated with magmatic sulphide mineralization.

Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pt (ppm)	Pd (ppm)	Au (ppb)	W (ppm)
3-Th-99	**12.64**	**46.8**	18.3	0.5	0.5	1.1	0.2
40-Tb-99	**17.64**	32.50	**69.10**	1.30	0.50	2.04	76.00
41-Tc-99	21.14	48.9	**83.2**	1	0.5	3.6	0.3
66-Th-99	5.3	19.2	**29.7**	0.25	0.5	1.2	0.08
97-Tb-99	**39.91**	18.2	43.6	0.25	0.5	0.5	**98**
141-Tb-99	3.62	3.30	8.90	0.41	0.50	3.18	**83**
165-Tb-99	3.24	6.50	9.40	**2.66**	0.50	3.27	16.00
166-Tc-99	4.01	8.1	10.5	**3.7**	0.5	1.7	0.24
215-Tb-99	**25.59**	23.50	**49.00**	0.65	0.50	1.40	**103.00**
216-Tc-99	**34.31**	34.3	**63.4**	**2.7**	0.5	0.5	0.61
223-Th-99	**12.27**	11.2	16.3	0.25	0.5	0.5	0.12
256-Tb-99	4.31	9.40	11.80	**2.34**	0.50	1.68	31.00
365-Tb-99	7.67	10.80	15.60	0.55	0.50	5.29	**115.00**
366-Tc-99	11.89	21.6	23.6	**2.4**	**2.9**	9.1	0.19
496-Tc-99	6.59	7.1	14.6	0.5	0.5	**23.6**	0.16
1013-Th-99	4.6	21.8	14	3.2	**4.2**	3.3	0.12
1032-Tc-99	6.84	6.6	19.3	0.5	0.5	**21.2**	0.12
1051-Th-99	2.82	8.2	8.4	**3.6**	**5.3**	4.2	0.06
1053-Tc-99	6.22	9.5	14.6	**3.1**	0.5	0.5	0.1
1069-Th-99	1.22	5.7	4.1	**4.2**	2	6.3	0.07
1080-Th-99	2.56	10.3	8.1	2.1	2.3	**6.5**	0.13
1095-Th-99	1.3	10.3	4.6	**3.5**	**4.5**	5.7	0.14
1106-Th-99	1.16	9.6	4.1	**3.6**	**4.9**	3.1	0.12
1128-Th-99	0.8	9.2	4.2	2.9	**4.2**	4.3	0.2
1139-Tb-99	5.93	6.70	9.60	**3.15**	0.50	1.17	34.00
1160-Tc-99	6.14	0.25	0.8	1.6	1.2	1.3	**1.29**
1164-Tb-99	16.35	30.30	**50.20**	0.25	0.50	0.50	**105.00**
1165-Tc-99	**30.79**	0.25	**81.1**	2.1	2.2	3.2	**0.74**
1178-Tc-99	0.025	6.3	0.25	0.5	0.5	0.5	**0.8**
1193-Tb-99	6.24	**45.30**	21.60	1.65	**2.50**	4.45	82.00
1194-Tc-99	7.99	0.25	23.6	1.5	**2.5**	8.9	0.32
1229-Tb-99	9.47	31.70	26.50	1.04	0.50	**5.54**	32.00
1230-Tc-99	11.97	0.25	24.8	**2.4**	0.5	5	0.4
1273-Tb-99	5.08	6.40	31.60	**2.01**	0.50	1.22	33.00
1336-Tb-99	13.61	15.90	38.20	0.98	0.50	2.02	**85.00**
8-Th-00	**14.78**	15.51	**26.48**	0.25	0.5	1.04	0.16

Table 15. Summary list of samples with anomalous values of elements of elements associated to magmatic sulphide mineralization. Values listed are regarded as anomalous based on proportional statistics from regional data. See Table 14 for summary of analytical methods used and detection limits for each element listed in the table. Anomalous values are highlighted.

Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pt (ppm)	Pd (ppm)	Au (ppb)	W (ppm)
9-Tb-00	9.87	12.45	32.06	1.8	**2.14**	1.27	0.08
49-Tb-00	13.48	24.86	42.46	0.65	0.50	**17.97**	0.35
80-Tb-00	8.40	7.47	17.01	0.58	**3.26**	0.50	0.44
84-Th-00	**19.05**	**85.51**	**30.21**	0.25	0.5	5.61	0.30
85-Tb-00	**25.10**	**135.81**	46.84	0.59	1.27	1.59	0.07
86-Tc-00	20.99	**100.35**	46.44	0.25	1.05	1.27	0.13
113-Th-00	11.36	37.38	**27.89**	0.5	0.5	5.61	0.31
114-Tb-00	12.09	**46.67**	33.67	0.61	0.50	**8.94**	0.27
169-Th-00	1.81	6.09	4.38	0.25	0.5	**61.49**	0.11
219-Tc-00	13.2	40.22	24.83	1.06	1.09	2.36	**0.82**
234-Th-00	5.7	33.08	15.34	**13.74**	1.88	**23.98**	**2.03**
236-Tc-00	9.69	28.31	21.03	0.74	0.5	2.11	**1.6**
250-Th-00	8.6	26.93	**42.62**	0.61	0.5	3.35	0.20
252-Tc-00	15.8	**91.11**	51.3	0.71	1.13	0.5	0.22
274-Th-00	3.33	**65.27**	9.73	0.25	0.5	6.07	0.07
279-Th-00	5.67	**70.08**	14.92	0.57	0.5	**9.37**	0.20
284-Th-00	7.63	**137.33**	19.98	1.8	0.5	**11.26**	**0.34**
286-Tc-00	7.96	30.93	15.07	1.66	**2.78**	**12.7**	0.42
289-Th-00	1.59	10.2	5.85	1.93	3.2	**6.91**	0.29
290-Tb-00	2.81	3.95	7.84	0.25	0.50	**21.80**	0.14
295-Tb-00	3.92	21.52	17.06	0.61	1.04	**6.55**	0.19
352-Th-00	1.52	14.45	5.62	2	**4.08**	5.36	0.18
370-Tb-00	**32.48**	**38.69**	**56.49**	**9.32**	**2.88**	1.05	0.03
371-Tc-00	**42.45**	**75.81**	**67.07**	**10.82**	**4.83**	1.95	0.025
430-Th-00	**41.42**	18.5	**27.16**	0.25	0.5	1.29	0.025
431-Tb-00	15.82	26.20	**48.89**	0.70	0.50	0.50	0.12
444-Th-00	**13.4**	**67.97**	19.96	0.25	0.5	1.93	0.15
1025-Tc-00	**23.94**	30.27	54.09	1.68	1.35	0.5	0.26
1062-Th-00	3.01	12.76	8.87	0.25	0.5	1.85	**0.37**
1067-Th-00	4.79	11.58	12.62	2.23	3.01	2.1	**0.39**
1069-Tc-00	22.2	**73.33**	**68.28**	1.63	1.17	0.5	0.38
1087-Th-00	2.42	8.59	6.57	0.59	0.5	1.93	**1.28**
1089-Tc-00	4.49	17.31	6.6	0.25	0.5	0.92	**2.42**
1185-Tc-00	9.58	14.42	19.23	0.52	0.5	**39.66**	0.6
1197-Tb-00	8.48	**40.89**	14.21	0.74	1.03	1.88	0.58
1198-Tc-00	12.48	**100.94**	29.83	1.41	**3.19**	**12.67**	0.59
1209-Th-00	0.59	9.76	6.3	**4.77**	0.5	2.39	0.16
1210-Tb-00	4.74	15.09	10.79	0.25	0.50	**6.09**	0.62
1237-Tb-00	**57.43**	**136.44**	**247.69**	**13.00**	**8.28**	3.03	0.05
1238-Tc-00	**58.91**	**265.64**	**390.72**	**17.27**	**25.27**	4.61	0.08
1242-Tb-00	0.03	0.25	0.25	1.20	**4.82**	4.60	0.03

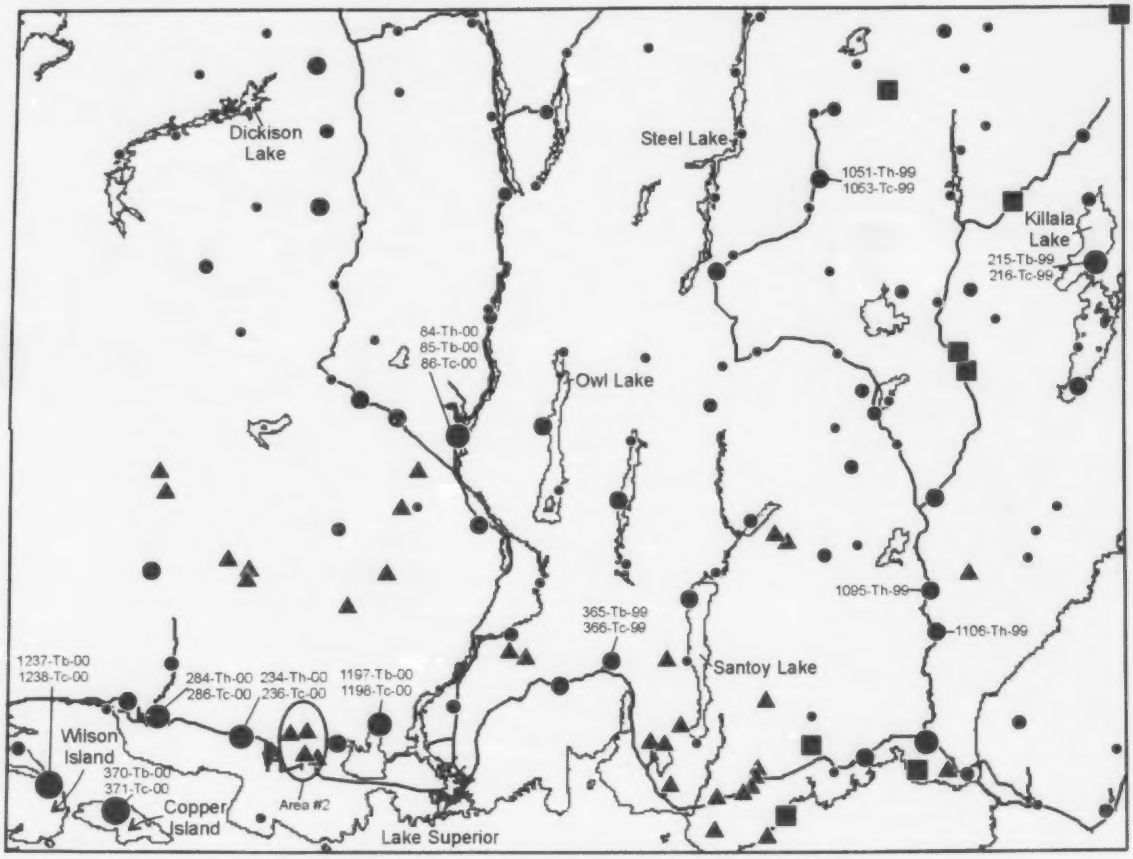
Table 15. (Continued)

Sample	Co (ppm)	Cu (ppm)	Ni (ppm)	Pt (ppm)	Pd (ppm)	Au (ppb)	W (ppm)
Priority Magmatic Sulphide Geochemical Exploration Targets							
215-Tb-99	**25.59**	23.50	**49.00**	0.65	0.50	1.40	**103.00**
216-Tc-99	**34.31**	34.3	**63.4**	**2.7**	0.5	0.5	0.61
365-Tb-99	7.67	10.80	15.60	0.55	0.50	5.29	**115.00**
366-Tc-99	11.89	21.6	23.6	**2.4**	**2.9**	9.1	0.19
1051-Th-99	2.82	8.2	8.4	**3.6**	**5.3**	4.2	0.06
1053-Tc-99	6.22	9.5	14.6	**3.1**	0.5	0.5	0.1
1095-Th-99	1.3	10.3	4.6	**3.5**	**4.5**	5.7	0.14
1106-Th-99	1.16	9.6	4.1	**3.6**	**4.9**	3.1	0.12
84-Th-00	**19.05**	**85.51**	**30.21**	0.25	0.5	5.61	0.30
85-Tb-00	**25.10**	**135.81**	46.84	0.59	1.27	1.59	0.07
86-Tc-00	20.99	**100.35**	46.44	0.25	1.05	1.27	0.13
234-Th-00	5.7	33.08	15.34	**13.74**	1.88	**23.98**	**2.03**
236-Tc-00	9.69	28.31	21.03	0.74	0.5	2.11	**1.6**
284-Th-00	7.63	**137.33**	19.98	1.8	0.5	**11.26**	**0.34**
286-Tc-00	7.96	30.93	15.07	1.66	**2.78**	**12.7**	0.42
370-Tb-00	**32.48**	**38.69**	**56.49**	**9.32**	**2.88**	1.05	0.03
371-Tc-00	**42.45**	**75.81**	**67.07**	**10.82**	**4.83**	1.95	0.025
1197-Tb-00	8.48	**40.89**	14.21	0.74	1.03	1.88	0.58
1198-Tc-00	12.48	**100.94**	29.83	1.41	**3.19**	**12.67**	0.59
1237-Tb-00	**57.43**	**136.44**	**247.69**	**13.00**	**8.28**	3.03	0.05
1238-Tc-00	**58.91**	**265.64**	**390.72**	**17.27**	**25.27**	4.61	0.08

Table 15. (Continued)

Rare Element Carbonatite

A summary of the elements associated with rare element carbonatite and related statistics from the regional data base are presented in Table 16. Many sites consist of one or 2 anomalous values associated with the large suite of elements used to define rare element carbonatite (Table 17). Although these samples should not be discounted outright the



- 0
- 1
- 2-3
- 4-6
- 7-10

Site Rank

▲ Site with an anomalous lake sediment PGE geochemical signature (after Ontario Geological Survey 2000b).

■ Site with an anomalous till or modern alluvium base metal heavy mineral signature (after Morris et al. 2000).

Anomalous lake sediment area (after Dyer 1997).

Area #2

Figure 6. Sample sites with anomalous geochemical magmatic sulphide mineralization signatures. Anomalous geochemical signatures are defined from the regional data base. The site ranking on which the diagram is based was determined from the number of anomalous values within the humus, till "B" and "C" horizons. The areas circled on the diagram are defined by lake sediment geochemistry (Dyer 1997).

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Humus	Be	ICP-MS	0.1 ppm	1.7	0.05	0.23	0.20	0.76
(118 Samples)	Cs	INAA	0.5 ppm	5.9	0.25	1.77	1.88	3.72
	Hf	INAA	0.5 ppm	9.6	0.25	3.42	6.13	7.95
	Li	ICP-MS	0.5 ppm	26.96	0.25	3.76	3.78	11.71
	Rb	INAA	20 ppm	91	10	32.01	44.00	62.3
	Sc	ICP-MS	0.1 ppm	3.59	0.05	0.94	0.90	2.59
	Ta	INAA	0.5 ppm	5	0.25	0.33	0.50	0.6
	Th	INAA	0.5 ppm	7.7	0.25	3.09	4.10	6.45
	U	INAA	0.1 ppm	31	0.05	1.08	0.90	1.75
	La	INAA	0.1 ppm	69	1.6	14.08	20.75	31.95
	Ce	INAA	1 ppm	110	3	24.35	35.75	62.45
	Eu	INAA	0.2 ppm	1.8	0.1	0.42	0.60	0.91
	Sm	INAA	0.1 ppm	9.4	0.3	1.97	2.50	3.96
	Tb	INAA	0.2 ppm	0.7	0.1	0.21	0.30	0.51
	Lu	INAA	0.1 ppm	0.5	0.05	0.12	0.20	0.2
Till "B"	Be	ICP-AES	0.1 ppm	2.1	0.1	0.53	0.50	1.2
(113 Samples)	Cs	INAA	1 ppm	12	0.5	2.71	3.00	5.4
	Hf	INAA	1 ppm	34	0.5	10.2	12.00	14.4
	Li	ICP-MS	0.5 ppm	66.2	0.25	17.15	20.15	31.68
	Rb	INAA	15 ppm	128	7.5	53.42	70.25	93.4
	Sc	ICP-MS	0.1 ppm	8.9	0.05	2.72	2.80	4.82
	Ta	INAA	0.5 ppm	27.3	0.35	0.94	1.10	2.02
	Th	INAA	0.2 ppm	18.7	2.3	6.7	7.70	13.06
	U	INAA	0.5 ppm	10.2	0.25	1.9	2.43	3.28
	La	INAA	0.5 ppm	88	0.25	24.3	28.15	45.04
	Ce	INAA	3 ppm	160	1.5	44.23	46.00	91.4
	Eu	INAA	0.2 ppm	3.5	0.1	0.91	0.90	1.64
	Sm	INAA	0.1 ppm	14	0.05	3.69	3.90	7.08
	Tb	INAA	0.5 ppm	1.2	0.25	0.31	0.25	0.68
	Lu	INAA	0.05 ppm	1.88	0.03	0.25	0.24	0.35

Table 16. Geochemical summary for elements associated with rare element carbonatite. See text for discussion.

samples highlighted within this report are those with 5 or more anomalous rare element carbonatite elements as determined from the regional data set. It should also be noted that many of the samples consist of anomalous values lower than those defined from the 4 till samples collected over the Prairie Lake Carbonatite (*compare* Tables 6 to 17).

Many of the samples highlighted with an anomalous rare element carbonatite signature overlap with geochemical signatures associated with other types of

Medium/ No. of Samples	Element	Analytical Method	Detection Limit	Max.	Min.	Mean	75th %ile	95th %ile
Till "C"	Be	ICP-MS	0.1 ppm	45.6	0.05	0.81	0.50	1.24
(116 Samples)	Cs	INAA	1 ppm	15	0.5	2.76	3.00	5
	Hf	INAA	1 ppm	26	0.5	9.27	10.00	13.25
	Li	ICP-MS	0.5 ppm	1000	0.25	31.09	31.35	75.37
	Rb	INAA	15 ppm	147	7.5	53.47	63.75	83.75
	Sc	ICP-MS	0.1 ppm	169.5	0.05	10.32	4.18	52.95
	Ta	INAA	0.5 ppm	20.9	0.25	0.71	1.00	1.3
	Th	INAA	0.2 ppm	33.4	0.1	7.61	8.10	15.28
	U	INAA	0.5 ppm	8.6	0.25	1.95	2.35	4.18
	La	INAA	0.5 ppm	105	0.5	28.66	32.10	56.23
	Ce	INAA	3 ppm	220	1.5	60.63	64.00	132.5
	Eu	INAA	0.2 ppm	4.3	0.1	1.15	1.20	2.13
	Sm	INAA	0.1 ppm	15	0.05	4.4	4.98	8.38
	Tb	INAA	0.5 ppm	1.5	0.25	0.39	0.25	0.9
	Lu	INAA	0.05 ppm	1.73	0.03	0.27	0.25	0.4

Table 16. (Continued)

mineralization and kimberlite. For example, samples 214-Th-99, 215-Tb-99 and 216-Tc-99 have a strong rare element carbonatite signature (Table 17) but also have a very strong kimberlite and volcanogenic massive sulphide signature.

Sample 1312-Th-99 has a reasonably strong rare element carbonatite geochemical signature. This sample was collected down ice from the Prairie Lake carbonatite suggesting possible dispersal of material off the carbonatite (Figure 7). The till matrix also has a heavy mineral suite with a rare element carbonatite signature (Morris et al. 2000).

Samples 1035-Th-99 and 1036-Tb-99 were collected from a site in the northeastern part of the study area (Figure 7). The site is near a contact between felsic intrusive and metasedimentary terranes. There is also a site with an anomalous heavy mineral signature associated with a stream sediment sample collected nearby (Figure 7). The heavy mineral signature from the till is more conducive to a base metal exploration target (Morris et al. 2000).

PEBBLE DATA

Pebble lithology data are commonly used to evaluate proximity of an overburden geochemical signature to source (McMartin 2000; Morris 1999a, 1999b). However, as previously reported (Morris et al. 2000) determining pebble lithology for the Killala Lake area is particularly difficult due to the complex composition of the local bedrock. For example, the migmatite suite may consist locally of metavolcanic rocks, minor

Element (ppm)	Be	Cs	Hf	Li	Rb	Sc	Ta	Th	U	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Sample																	
3-Th-99	0.3	4	5.9	11.2	50	2.3	**0.6**	5.1	1.6	25	42	16	3	0.7	0.3	1.3	0.2
12-Th-99	0.2	1.3	**8.4**	8.5	61	1	**0.7**	**6.8**	1	27	55	25	**4.3**	**1**	0.4	1.2	0.2
14-Tc-99	0.7	2	13	11.6	83	1.9	0.25	13.1	2.6	38.5	102	30	7.3	2	**0.9**	1.7	0.26
29-Tc-99	0.6	2	9	14.7	51	2.1	**1.6**	6.6	2	24.8	50	14	3.5	0.9	0.3	1.4	0.21
39-Th-99	0.05	1.5	7.1	4.3	44	1.4	0.5	**7**	1.2	29	45	19	3.1	0.6	0.4	1.3	0.2
40-Tb-99	0.7	5	13	**35.4**	**104**	**7.2**	0.25	10.6	2.3	40.4	74	26	5.8	1.1	0.3	1.6	0.24
41-Tc-99	0.6	**5**	9	25.2	68	9.4	0.25	10.2	1.9	38.8	83	27	5.3	1.2	0.5	1.6	0.23
48-Tb-99	0.3	3	12	24.8	84	4.7	0.25	9	2.4	31.9	52	23	4.3	0.7	**1.2**	1.7	0.25
56-Tb-99	0.4	2	**24**	14	81	2.2	0.25	13	2.4	41.5	**98**	28	6.9	1.6	0.3	2.1	0.32
68-Tc-99	0.3	3	10	12.7	57	3.3	**1.3**	6.6	1.6	28	52	18	3.9	0.9	0.3	1.4	0.22
87-Tc-99	**45.6**	3	10	**1000**	44	**170**	0.8	8.2	1.6	34.3	68	21	5	1.3	0.6	2	0.3
93-Tc-99	**1.6**	3	5	22.6	56	4.2	0.25	15.2	**7**	44.6	76	27	5.7	1.5	0.3	1.1	0.17
97-Tb-99	**1.5**	5	11	**52.7**	7.5	4	**2.3**	**15.6**	**5.3**	**52.5**	**109**	**47**	**12**	**2.9**	0.3	1.7	0.26
140-Th-99	0.05	1.1	**8.2**	3	44	0.7	0.25	3.9	0.9	16	25	10	1.7	0.4	0.1	1.1	0.2
141-Tb-99	0.5	2	12	**31.8**	48	2.4	0.25	5	1.3	18.7	32	11	2.7	0.7	0.3	1.3	0.21
142-Tc-99	0.3	2	**18**	10.5	57	1.7	0.25	8.1	2.5	28	52	23	4	1.1	0.3	1.9	0.3
155-Th-99	0.1	1.7	**8.5**	11	56	1.7	0.25	5.5	0.9	23	43	19	3.3	0.8	0.4	1.3	0.2
194-Tb-99	0.2	2	**15**	13.7	49	1.1	0.25	5.8	2.1	20.7	33	11	2.8	0.7	0.3	1.6	0.25
195-Tc-99	0.05	1	**14**	6.6	51	0.8	1.2	5.8	1.3	21.4	38	15	2.9	0.8	0.3	1.5	0.22
214-Th-99	0.2	1	2.6	5.1	27	2	**0.9**	3.5	0.9	23	46	21	3.3	0.9	0.4	0.6	0.1
215-Tb-99	**1.3**	2	11	29.4	48	**8.9**	**6.7**	11.9	3.1	**88**	**160**	**66**	**14**	**3.5**	**0.9**	1.5	0.24
216-Tc-99	**1.4**	4	9	33.4	46	10.8	**6.9**	15.2	**4.8**	**105**	**218**	**90**	**15**	**4.3**	**1**	2	0.3
300-Th-99	0.05	1.4	**8.6**	1.1	**66**	0.4	0.5	**6.9**	1.1	28	44	20	3.1	0.6	0.3	1.4	0.2
337-Tc-99	0.2	**5**	11	4.2	57	0.9	0.25	6.5	2	20.4	37	16	3.3	0.9	0.3	1.7	0.26
349-Tc-99	0.6	4	7	38.6	**86**	3.7	0.25	4.8	1.7	19.6	36	19	3.2	1	0.3	1.3	0.2
366-Tc-99	0.4	4	7	33.4	**87**	4.6	0.25	4.6	1.6	15.5	29	11	2.8	0.9	0.3	1.6	0.25
494-Th-99	0.05	1.3	6.6	1.7	42	0.05	**0.6**	3.9	0.8	20	29	12	2.2	0.5	0.1	0.8	0.1
1002-Th-99	0.05	1	7.9	1.7	44	0.05	0.25	3.9	**2.6**	15	26	11	2	0.5	0.3	1	0.2
1013-Th-99	0.1	2.6	4	3.6	42	0.6	0.25	3.6	**4.4**	21	37	15	2.6	0.6	0.3	1.2	0.2
1014-Tb-99	0.4	3	9	29.5	82	2.8	0.7	6.3	**3.4**	24.6	37	15	3.4	0.8	**0.8**	1.5	0.22
1020-Th-99	0.1	**5.9**	7.1	2.7	62	1.6	**0.7**	6.3	0.4	23	42	17	3	0.7	0.4	**1.6**	0.2
1021-Tb-99	0.1	5	14	6.2	76	1.6	1.1	7.5	**3.4**	26.5	43	19	3.5	0.7	0.3	1.7	0.25
1035-Th-99	0.05	2.1	7.4	2.3	**71**	0.2	0.25	4.5	0.6	18	36	13	2.3	0.5	0.3	1.3	0.2
1036-Tb-99	0.6	2	**18**	25.8	**95**	3.3	0.25	12.3	2.5	**55.5**	**107**	**40**	**7.9**	1.3	0.3	2.1	0.31
1058-Th-99	0.05	**3.8**	6.5	5.4	50	1	**0.25**	4.7	1.3	17	34	15	2.5	0.5	0.3	1.1	0.2
1069-Th-99	0.05	1.6	**9.6**	2.4	53	0.4	**0.6**	6.4	1.1	23	44	17	3	0.7	0.4	**1.6**	0.2
1080-Th-99	0.05	1.9	**9.6**	4.8	51	1	0.25	**7.3**	0.8	27	52	20	3.5	0.8	0.4	1.5	0.2

Table 17. Summary list of samples with anomalous values of elements associated with rare element carbonatite. Values listed are regarded as anomalous based on proportional statistics from regional data. See Table 16 for summary of analytical methods used and detection limits for each element. Anomalous values are highlighted.

Element (ppm)	Be	Cs	Hf	Li	Rb	Sc	Ta	Th	U	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Sample																	
1107-Tb-99	0.5	2	11	10.4	47	1.9	1.4	6.6	**3.5**	21.7	34	13	2.9	0.7	0.6	1.8	0.26
1123-Th-99	0.05	1.3	1.5	0.6	27	0.05	0.25	2.5	0.6	**50**	**78**	**28**	3.7	0.5	0.4	0.9	0.1
1124-Tb-99	0.5	3	12	12.1	53	1.6	**4.1**	10.9	**4.2**	42.6	63	23	4.5	0.9	0.3	**2.3**	**0.35**
1125-Tc-99	**1.3**	2	10	24.1	66	3.3	**2.9**	**15.6**	4	**66.5**	108	37	7.3	1.5	0.8	**2.7**	**0.41**
1129-Tb-99	**2.1**	0.5	0.5	9.3	7.5	**5.6**	0.25	0.25	0.25	0.25	1.5	2.5	0.1	0.1	0.3	0.1	0.025
1130-Tc-99	1.1	2	9	17.3	66	3.3	**1.3**	14.6	2.7	39.7	69	28	5.3	1.4	0.7	2.2	0.33
1151-Th-99	0.05	1.1	1.9	0.6	28	0.5	0.25	3.4	**2**	**43**	62	23	2.1	0.3	0.3	0.8	0.1
1152-Tb-99	0.2	2	9	4.5	**128**	0.7	**4.7**	9.1	2	**48.7**	60	20	3.6	0.5	0.3	1.3	0.2
1158-Th-99	0.05	1.6	7.5	1	34	0.4	5	4.1	0.5	30	**65**	**27**	**4.8**	**1.4**	**0.6**	**3.8**	**0.5**
1159-Tb-99	0.7	**8**	**34**	7.2	**128**	3.4	**27**	**17.7**	**10**	**70.3**	**153**	**61**	**13**	**2.4**	0.3	**13**	**1.88**
1160-Tc-99	0.05	**9**	**26**	58.9	**136**	38.8	**21**	**21.4**	**8.6**	**58.7**	**140**	37	**9.3**	1.8	**1.5**	**12**	**1.73**
1163-Th-99	0.05	1.1	1.9	1	27	0.5	0.25	2.2	**31**	8.5	17	7	1.4	0.3	0.1	0.6	0.1
1164-Tb-99	0.5	**12**	8	30.4	**96**	**4.9**	0.25	6.8	3.2	29.7	49	16	4.4	1.1	0.3	**2.3**	**0.35**
1173-Th-99	**1.7**	1	0.7	4.1	10	0.3	0.25	0.7	0.3	9.2	16	8	1.2	0.3	0.1	0.3	0.05
1177-Tb-99	0.2	5	**15**	2.3	56	0.8	0.25	7	2.8	24.6	38	16	3.8	0.9	0.3	1.8	0.26
1178-Tc-99	0.05	**5**	11	65.6	39	46.7	1	5.4	2.2	18.2	33	11	3	0.8	0.3	1.5	0.24
1193-Tb-99	**1.7**	0.5	2	11.4	7.5	**8.6**	0.25	**13.1**	2.8	**62.8**	**101**	**44**	**9.9**	**1.9**	**1.1**	1.3	0.19
1194-Tc-99	0.05	0.5	0.5	70.4	7.5	47.4	0.25	**17.1**	**4.7**	**79.6**	**142**	**64**	**13**	**3.1**	0.3	2.1	0.32
1208-Tc-99	0.05	4	11	**75.6**	47	**57**	0.25	14.8	2.7	38.3	74	28	5.2	1.5	**1.1**	1.8	0.24
1219-Tc-99	0.05	3	9	**83**	63	**66.9**	0.25	6.6	0.25	21.8	45	15	3.6	1	0.3	1.5	0.22
1228-Th-99	0.5	2.6	6.2	8.5	43	0.8	0.25	2.8	0.6	11	24	10	3.2	0.9	**0.6**	**2.7**	**0.4**
1230-Tc-99	0.05	2	9	**86.7**	7.5	**72.2**	0.25	5.6	**7.6**	23.3	115	21	5.4	1.6	0.8	**2.9**	**0.43**
1239-Tc-99	0.05	3	10	**91.3**	42	**79.5**	**1.3**	6.5	1.6	22.3	45	15	3.1	0.8	0.3	1.7	0.25
1252-Tc-99	0.05	**5**	7	**96.3**	62	**86.3**	0.25	6.4	2.5	31.8	60	20	4.1	1.2	0.3	1.5	0.23
1273-Tb-99	0.3	5	12	12.4	68	1.2	**2.5**	5.2	2.7	21.6	37	14	4.4	1.1	0.3	2	0.32
1312-Th-99	0.2	1	3.5	1.1	22	0.7	0.25	**7.7**	0.7	**45**	**74**	**36**	**6.1**	**1.5**	**0.6**	**2**	**0.3**
1336-Tb-99	0.9	3	11	28	63	4.6	1.3	**18.7**	1.9	30.9	60	17	5.2	1.4	0.3	**2.3**	**0.35**
8-Th-00	0.49	3.3	4.6	**26.96**	33	**2.63**	0.25	4.2	1.7	18	34	15	3.2	0.6	0.4	1.1	0.2
9-Tb-00	0.74	4	13	**39.68**	45	3.63	1.1	6.3	2.6	27	50	21	4	1	0.3	1.9	0.3
10-Tc-00	0.55	**5**	12	36.29	50	3.82	0.25	5.8	2.6	23.4	42	18	3.7	1	0.3	1.6	0.33
48-Th-00	0.53	2.3	7.8	**12.38**	**91**	**2.79**	0.25	**6.7**	1.5	20	40	17	3.3	0.6	0.4	1.3	0.2
69-Th-00	0.05	2.2	5	5.94	**65**	1.46	0.25	4.2	1	15	29	13	2.5	0.5	0.3	0.9	0.1
70-Tb-00	0.48	2	**15**	15.34	43	2.12	0.25	5.9	0.25	24.8	46	22	3.8	1	0.3	1.8	0.28
71-Tc-00	0.47	2	**17**	9.16	49	2.95	0.25	11	1.4	37.3	96	28	5.5	1.3	0.6	2.4	0.36
81-Tc-00	0.93	**5**	11	20.83	**88**	4.1	0.25	12	1.9	30.4	102	25	4	1.1	0.3	1.9	0.31
84-Th-00	**0.94**	3.4	2.4	11.59	30	**3.32**	0.25	5.2	**2.2**	**49**	**95**	**53**	**9.4**	**1.8**	**0.7**	**1.6**	0.2
85-Tb-00	**1.67**	5	7	19.9	7.5	3.84	0.25	6.9	2.2	36.9	66	**36**	7	**1.8**	0.3	1.9	**0.35**
86-Tc-00	**1.36**	4	8	29.81	31	5.05	0.25	8	2.3	45.3	81	**49**	**9.2**	**2.2**	0.8	2.1	0.38
113-Th-00	**0.8**	**5.8**	4.2	**20.83**	45	**3.59**	**0.6**	4.7	1.2	17	38	13	2.8	0.7	0.3	1.1	0.2
114-Tb-00	**1.69**	**6**	10	28.29	39	4.46	0.25	6.8	1.6	29.5	61	20	4.5	1.2	0.3	1.6	0.31
115-Tc-00	1.22	**5**	10	22.9	37	3.95	0.25	6.5	2	27	60	17	4.2	1	0.3	1.7	0.27

Table 17. (Continued)

Element (ppm)	Be	Cs	Hf	Li	Rb	Sc	Ta	Th	U	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Sample																	
219-Tc-00	0.68	2	10	13.68	51	3.65	**1.5**	6.5	1.2	23.3	62	18	4.3	1.3	0.7	2.3	0.37
236-Tc-00	0.78	1	10	26.57	53	4.33	0.25	8.4	0.8	24.9	48	22	4.8	1.3	**0.9**	2.1	0.36
245-Tc-00	0.97	2	12	23.1	52	5.43	0.25	14.1	1	55.4	**220**	34	5.6	1.4	0.3	1.4	0.26
250-Th-00	0.34	3.7	4.1	11.16	44	**2.66**	**0.6**	5.6	**2.7**	**63**	**88**	**46**	**7.9**	**1.5**	**0.7**	**1.6**	0.2
251-Tb-00	1.05	4	11	**48.68**	65	3.08	0.25	9.5	1.6	23.8	41	13	3.2	1	0.3	1	0.18
252-Tc-00	**1.7**	4	11	41.63	7.5	6.07	0.25	**33.4**	**5.5**	**96**	**202**	**75**	**11**	**2.8**	0.3	2.2	0.3
264-Tb-00	0.95	3	10	**66.2**	33	3.43	0.25	5	1.6	16.4	36	17	4.3	1.4	**0.8**	**3**	**0.5**
265-Tc-00	0.72	3	10	62.36	55	3.84	1.2	6.1	1.5	20.1	67	18	4.4	1.4	0.3	**2.9**	**0.48**
275-Tb-00	1.06	2	11	17.78	53	3.46	1.3	10.5	3	40.9	80	33	**7.2**	**1.7**	0.3	**2.5**	**0.43**
276-Tc-00	0.69	1	**14**	14.19	56	3.01	1.2	8.3	1.5	35.2	73	27	6.2	1.6	**0.9**	**3**	**0.5**
280-Tb-00	0.89	1	12	16.65	48	3.03	0.25	7.4	1.6	28.4	60	23	5.4	1.4	0.6	**2.3**	**0.37**
281-Tc-00	0.88	1	9	14.68	42	3.05	0.25	5.6	1.1	25.1	50	21	4.9	1.4	0.3	2.2	**0.4**
284-Th-00	0.05	1.6	4.3	**12.53**	**64**	2.58	0.25	4.8	1.3	20	39	18	3.9	0.8	0.5	**1.6**	0.2
285-Tb-00	1.14	5	7	26.71	74	3.86	1.8	**15.5**	2.8	28.5	87	25	4.9	1.5	0.3	**2.3**	0.31
286-Tc-00	0.44	2	**14**	17.22	70	3	0.7	10.7	1.9	33.2	83	27	5.4	1.4	0.6	2.6	**0.43**
349-Tc-00	0.17	1	7	14.77	24	6.09	0.25	4.1	1.2	17.5	40	16	4	1.3	0.8	2.5	**0.4**
353-Tb-00	0.82	2	7	16.92	28	4.06	0.25	**14.1**	2.7	38.5	72	33	5.8	1.5	0.3	1.6	0.26
430-Th-00	**1.09**	**3.8**	3.8	**14.46**	52	2.24	0.25	4	1.7	**69**	**110**	**50**	**8.5**	**1.7**	**0.7**	1.3	0.2
1025-Tc-00	0.05	3	10	24.52	63	6.4	0.25	**15.5**	1.7	51.6	104	34	6.6	1.1	0.3	1.5	0.24
1048-Th-00	**0.81**	2.6	5.7	**18.43**	**83**	**3.02**	0.25	5.8	1.4	20	39	17	3.2	0.6	0.4	1.1	0.2
1050-Tc-00	0.13	3	9	18.36	55	4.14	**1.3**	9	2.5	28.1	70	20	4.2	1	0.3	1.5	0.24
1069-Tc-00	0.52	**8**	9	75.29	57	13.37	0.25	**16.9**	3.1	**91.6**	**185**	**72**	**12**	1.6	0.8	1.6	0.27
1087-Th-00	0.27	1.5	5.9	2.45	35	1.14	0.25	3.4	1.2	12	22	10	2.1	0.5	0.3	**1.6**	0.2
1088-Tb-00	0.5	1	9	8.97	28	2.85	0.25	4.4	1.8	16.2	30	12	3	0.8	0.3	1.9	**0.35**
1115-Th-00	**1.13**	**5.4**	4.1	6.75	62	1.04	**0.6**	2.9	0.9	14	23	12	2.4	0.5	0.3	0.8	0.1
1116-Tb-00	0.5	**7**	10	26.81	91	2.81	0.25	4.5	1.8	18.2	35	14	3	0.8	0.3	1.3	0.25
1117-Tc-00	0.05	**9**	10	16.7	**107**	1.97	0.25	5.4	2.2	20.5	36	16	3.3	0.8	0.3	1.5	0.25
1138-Tb-00	0.5	**7**	10	26.96	62	1.99	1.1	4.8	1.3	20.7	35	16	2.9	0.7	0.3	1.7	0.26
1139-Tc-00	0.34	**8**	7	35.04	62	2.98	0.25	5.5	1.5	21.1	46	15	3	0.8	0.3	1.3	0.18
1184-Tb-00	0.39	3	9	13.15	7.5	3.34	0.25	7.6	2.3	22.5	56	20	3.9	1.2	**0.9**	2	0.27
1198-Tc-00	1.1	2	6	15.79	7.5	7.11	0.25	12.5	2.4	40.4	104	38	8.1	**2.3**	**1**	2.4	0.22
1237-Tb-00	0.63	0.5	3	6.99	7.5	**8.46**	0.8	2.3	2.4	14.7	36	18	3.4	1.2	0.3	1.3	0.14
1238-Tc-00	0.59	4	3	5.82	7.5	16.32	0.25	3.3	1.7	30.9	98	**40**	7.9	**2.5**	**1.3**	**2.8**	0.37
1242-Tb-00	0.5	**7**	3	0.25	**94**	0.05	0.25	4.9	2.3	17.4	36	17	2.9	1	0.3	1.4	0.08
1243-Tc-00	0.73	**15**	7	15.97	**147**	2.22	0.25	7.4	3.1	25.9	60	26	3.7	1.1	0.5	2.2	0.31
Priority Rare-Earth Geochemical Exploration Targets																	
12-Th-99	0.2	1.3	**8.4**	8.5	61	1	**0.7**	**6.8**	1	27	55	25	**4.3**	**1**	0.4	1.2	0.2
97-Tb-99	**1.5**	5	11	**52.7**	7.5	4	**2.3**	**15.6**	**5.3**	**52.5**	**109**	**47**	**12**	**2.9**	0.3	1.7	0.26

Table 17. (Continued)

Element (ppm)	Be	Cs	Hf	Li	Rb	Sc	Ta	Th	U	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Sample																	
Priority Rare-Earth Geochemical Exploration Targets (Continued)																	
214-Th-99	0.2	1	2.6	5.1	27	2	**0.9**	3.5	0.9	23	46	21	3.3	0.9	0.4	0.6	0.1
215-Tb-99	**1.3**	2	11	29.4	48	**8.9**	**6.7**	11.9	3.1	**88**	**160**	**66**	**14**	**3.5**	**0.9**	1.5	0.24
216-Tc-99	**1.4**	4	9	33.4	46	10.8	**6.9**	15.2	**4.8**	**105**	**218**	**90**	**15**	**4.3**	**1**	2	0.3
1035-Th-99	0.05	2.1	7.4	2.3	**71**	0.2	0.25	4.5	0.6	18	36	13	2.3	0.5	0.3	1.3	0.2
1036-Tb-99	0.6	2	**18**	25.8	**95**	3.3	0.25	12.3	2.5	**55.5**	**107**	**40**	**7.9**	1.3	0.3	2.1	0.31
1123-Th-99	0.05	1.3	1.5	0.6	27	0.05	0.25	2.5	0.6	**50**	**78**	**28**	3.7	0.5	0.4	0.9	0.1
1124-Tb-99	0.5	3	12	12.1	53	1.6	**4.1**	10.9	**4.2**	42.6	63	23	4.5	0.9	0.3	**2.3**	**0.35**
1125-Tc-99	**1.3**	2	10	24.1	66	3.3	**2.9**	**15.6**	4	**66.5**	108	37	7.3	1.5	0.8	**2.7**	**0.41**
1158-Th-99	0.05	1.6	7.5	1	34	0.4	5	4.1	0.5	30	**65**	**27**	**4.8**	**1.4**	**0.6**	**3.8**	**0.5**
1159-Tb-99	0.7	**8**	**34**	7.2	**128**	3.4	**27**	**17.7**	**10**	**70.3**	**153**	**61**	**13**	**2.4**	0.3	**13**	**1.88**
1160-Tc-99	0.05	**9**	**26**	58.9	**136**	38.8	**21**	**21.4**	**8.6**	**58.7**	**140**	37	**9.3**	1.8	**1.5**	**12**	**1.73**
1163-Th-99	0.05	1.1	1.9	1	27	0.5	0.25	2.2	**31**	8.5	17	7	1.4	0.3	0.1	0.6	0.1
1164-Tb-99	0.5	**12**	8	30.4	**96**	**4.9**	0.25	6.8	3.2	29.7	49	16	4.4	1.1	0.3	**2.3**	**0.35**
1193-Tb-99	**1.7**	0.5	2	11.4	7.5	**8.6**	0.25	**13.1**	2.8	**62.8**	**101**	**44**	**9.9**	**1.9**	**1.1**	1.3	0.19
1194-Tc-99	0.05	0.5	0.5	70.4	7.5	47.4	0.25	**17.1**	**4.7**	**79.6**	**142**	**64**	**13**	**3.1**	0.3	2.1	0.32
1228-Th-99	0.5	2.6	6.2	8.5	43	0.8	0.25	2.8	0.6	11	24	10	3.2	0.9	**0.6**	**2.7**	**0.4**
1230-Tc-99	0.05	2	9	**86.7**	7.5	**72.2**	0.25	5.6	**7.6**	23.3	115	21	5.4	1.6	0.8	**2.9**	**0.43**
1312-Th-99	0.2	1	3.5	1.1	22	0.7	0.25	**7.7**	0.7	**45**	**74**	**36**	**6.1**	**1.5**	**0.6**	**2**	**0.3**
84-Th-00	**0.94**	3.4	2.4	11.59	30	**3.32**	0.25	5.2	**2.2**	**49**	**95**	**53**	**9.4**	**1.8**	**0.7**	**1.6**	0.2
85-Tb-00	**1.67**	5	7	19.9	7.5	3.84	0.25	6.9	2.2	36.9	66	**36**	7	**1.8**	0.3	1.9	**0.35**
86-Tc-00	**1.36**	4	8	29.81	31	5.05	0.25	8	2.3	45.3	81	**49**	**9.2**	**2.2**	0.8	2.1	0.38
113-Th-00	**0.8**	**5.8**	4.2	**20.83**	45	**3.59**	**0.6**	4.7	1.2	17	38	13	2.8	0.7	0.3	1.1	0.2
114-Tb-00	**1.69**	**6**	10	28.29	39	4.46	0.25	6.8	1.6	29.5	61	20	4.5	1.2	0.3	1.6	0.31
115-Tc-00	1.22	**5**	10	22.9	37	3.95	0.25	6.5	2	27	60	17	4.2	1	0.3	1.7	0.27
250-Th-00	0.34	3.7	4.1	11.16	44	**2.66**	**0.6**	5.6	**2.7**	**63**	**88**	**46**	**7.9**	**1.5**	**0.7**	**1.6**	0.2
251-Tb-00	1.05	4	11	**48.68**	65	3.08	0.25	9.5	1.6	23.8	41	13	3.2	1	0.3	1	0.18
252-Tc-00	**1.7**	4	11	41.63	7.5	6.07	0.25	**33.4**	**5.5**	**96**	**202**	**75**	**11**	**2.8**	0.3	2.2	0.3

Table 17. (Continued)

Element (ppm)	Be	Cs	Hf	Li	Rb	Sc	Ta	Th	U	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Sample																	
Priority Rare-Earth Geochemical Exploration Targets (Continued)																	
430-Th-00	**1.09**	**3.8**	3.8	**14.46**	52	2.24	0.25	4	1.7	**69**	**110**	**50**	**8.5**	**1.7**	**0.7**	1.3	0.2
1069-Tc-00	0.52	**8**	9	75.29	57	13.37	0.25	**16.9**	3.1	**91.6**	**185**	**72**	**12**	1.6	0.8	1.6	0.27

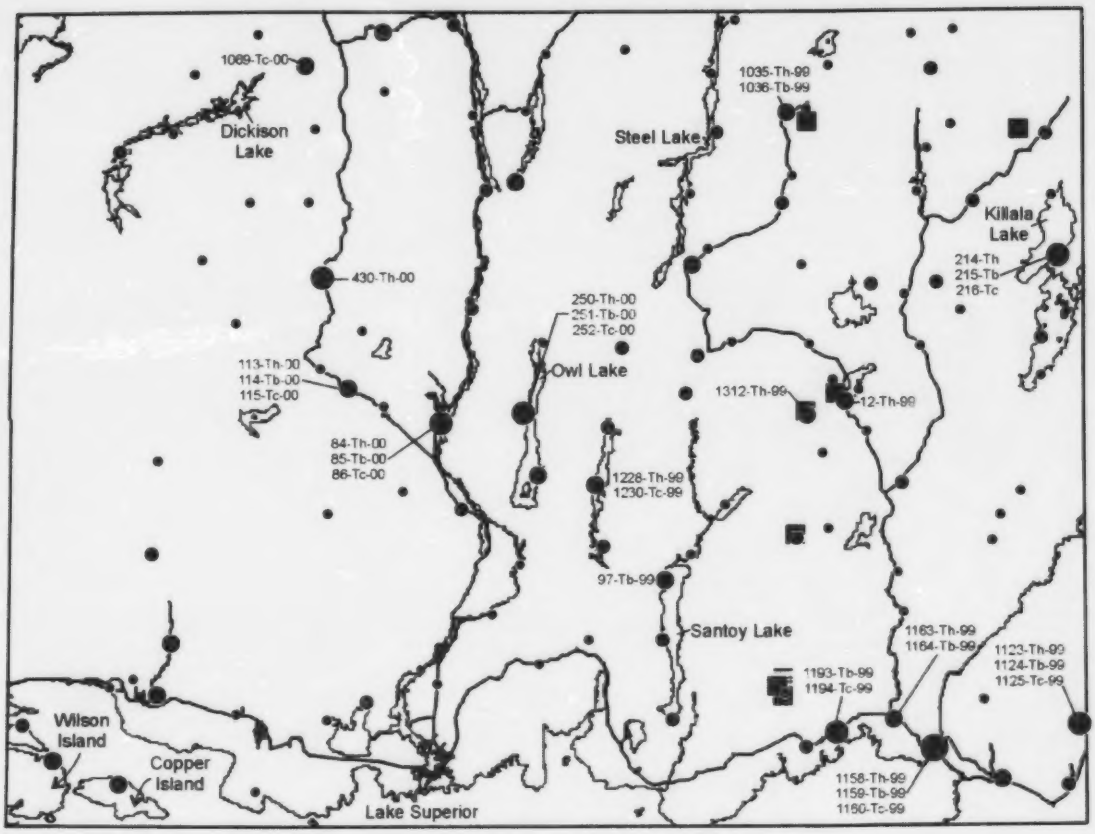
Table 17. (Continued)

metasedimentary rocks and mafic and/or granite gneiss. The bedrock unit is also relatively minor compared to the surrounding granitic terrane, therefore, transport of felsic intrusive clasts onto the migmatite terrane is likely significant. These factors would explain the pebble lithology percentages identified in tills collected over migmatite terrane (Figure 8a).

Similarly, the suite of rocks which define the metasedimentary bedrock unit contains local pods and stringers of felsic intrusive and ultramafic rocks. Also, the metasedimentary pebbles break down quickly in the shallow tills that occur over the metasedimentary terrane. The relatively low percentage of metasedimentary pebbles in till samples collected over metasedimentary terrane is likely due to this local influx of felsic intrusive and ultramafic pebbles and the *in situ* decomposition of metasedimentary pebbles (Figure 8b).

The percentage of metavolcanic pebbles increases significantly within tills collected over metavolcanic terranes (Figure 8c). The large component of felsic intrusive pebbles is likely due to the large source area of this material abutting the volcanic terranes. Tills collected over felsic intrusive terranes contain a high percentage of metasedimentary material that is difficult to explain (Figure 8d). Perhaps there are more metasedimentary units surrounding or located within the felsic intrusive terranes than is currently recognized.

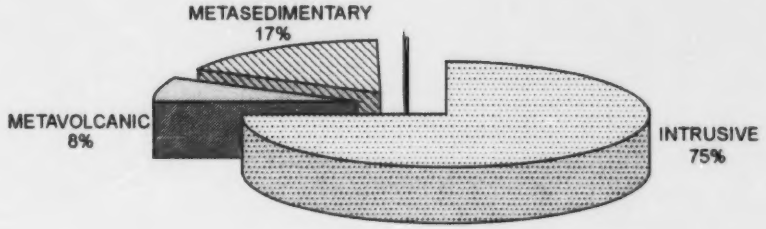
Although difficult to use, the pebble data are obviously useful where the pebble lithology composition of a sample strongly reflects the local bedrock type, such as sample 1239-Tp-00 (Morris 2001, Appendix H). However, complications arise where the pebble lithology composition of a sample consists of many different pebble lithologies, and may either reflect the lithology of the local bedrock or may represent material transport to the site from distal sources (such as sample 240-Tp-99; Morris 2001, Appendix H).



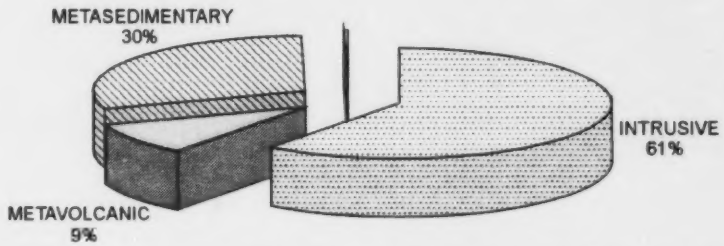
- 0-1 ■ Site with an anomalous till or modern alluvium rare element carbonatite heavy mineral signature (after Morris et al. 2000).
- 2-4
- 5-10
- 11-19
- 20-32

Site Rank

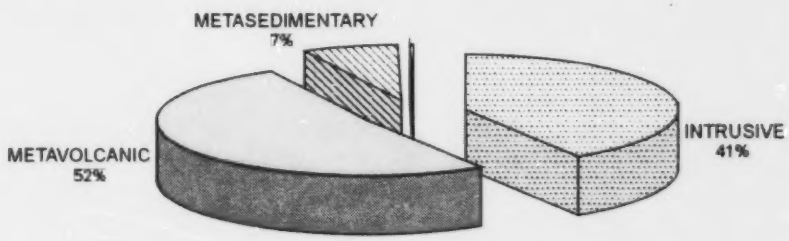
Figure 7. Sample sites with anomalous geochemical rare element carbonatite signatures. Anomalous geochemical signatures are defined from the regional data base using the 95th percentile. The site ranking on which the diagram is based was determined from the number of anomalous values within the humus, till "B" and "C" horizons.



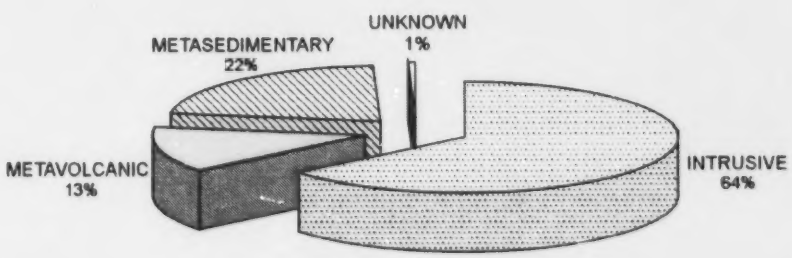
8a. Pebbles recovered from till samples collected over migmatized terrane.



8b. Pebbles recovered from till samples collected over metasedimentary terrane.



8c. Pebbles recovered from till samples collected over metavolcanic terrane.



8d. Pebbles recovered from till samples collected over felsic intrusive terrane.

Figure 8. Pebble composition of till samples collected over different bedrock terranes. Data is summarized in Morris (2001, Appendix H).

CONCLUSIONS

Synthesizing multiple geochemical data sets from a variety of media in order to identify potential mineral exploration targets is difficult. Traditionally, many geochemical distribution plots are produced in an attempt to identify sample sites that have elements with values that are anomalous relative to the rest of the data set. The method used in this report was successful in evaluating humus, till "B" and "C" horizon geochemistry at each site. This was accomplished by ranking the sample site based on the number of anomalous values (derived from the regional data set) related to suites of elements associated with specific types of mineralization or rock types. As such, a number of interesting VMS, MS, kimberlite and rare element carbonatite exploration targets were identified.

There are of course, limitations to this approach. For example, a number of the suites of elements shared, in part, the same elements. Therefore, a single sample site could represent an interesting exploration target for more than one type of mineralization or rock type. As such, it is important to evaluate as much geological information as is available for each site. Information such as bedrock types, contacts, presence or absence of faults, geophysical properties, presence or absence of nearby mineral occurrences, lake sediment geochemical data and any heavy mineral data from the sample site or nearby till or modern alluvium sites are important geologic aspects to consider. Certainly, heavy mineral data from the 2000 field season will be critical in evaluating the geochemical signatures derived from material sampled in 2000.

Finally, and most important, the humus, till "B" and "C" materials collected for this project were sampled from terranes with a very thin overburden cover. Much bedrock is exposed and is readily available for prospecting. If nothing else, the sample sites with anomalous geochemical values reported here represent an excellent starting point for exploration geology in the Schreiber-Killala Lake area.

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Appendix A: Sample Site Locations

Summary of Abbreviations

Alk:	Alkalic
Fv:	Felsic metavolcanic
Gn:	Gneiss
Gr:	Granite
Mm:	Migmatite
Ms:	Metasediment
Mv:	Mafic metavolcanic
Th:	Humus
Tb:	Till "B" horizon
Tc:	Till "C" horizon
Um:	Ultramafic

Appendix A: Sample Site Locations

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
3-Th-99	524267	5422877	Mm
4-Tb-99	524267	5422877	Mm
5-Tc-99	524267	5422877	Mm
6-Tp-99	524267	5422877	Mm
12-Th-99	520308	5428401	Ms
13-Tb-99	520308	5428401	Ms
14-Tc-99	520308	5428401	Ms
15-Tp-99	520308	5428401	Ms
21-Th-99	517898	5432305	Ms
22-Tb-99	517898	5432305	Ms
23-Tc-99	517898	5432305	Ms
24-Tp-99	517898	5432305	Ms
27-Th-99	512562	5432217	Ms
28-Tb-99	512562	5432217	Ms
29-Tc-99	512562	5432217	Ms
30-Tp-99	512562	5432217	Ms
33-Th-99	517304	5437538	Ms
34-Tb-99	517304	5437538	Ms
35-Tc-99	517304	5437538	Ms
36-Tp-99	517304	5437538	Ms
39-Th-99	509816	5437608	Ms
40-Tb-99	509816	5437608	Ms
41-Tc-99	509816	5437608	Ms
42-Tp-99	509816	5437608	Ms
47-Th-99	510880	5438572	Ms
48-Tb-99	510880	5438572	Ms
49-Tc-99	510880	5438572	Ms
50-Tp-99	510880	5438572	Ms
55-Th-99	508587	5406603	Mv
56-Tb-99	508587	5406603	Mv
57-Tc-99	508587	5406603	Mv
66-Th-99	524810	5453569	Gn
67-Tb-99	524810	5453569	Gn
68-Tc-99	524810	5453569	Gn
69-Tp-99	524810	5453569	Gn
74-Th-99	527663	5453815	Gn
75-Tb-99	527663	5453815	Gn
76-Tc-99	527663	5453815	Gn
77-Tp-99	527663	5453815	Gn
79-Th-99	527476	5447317	Gn
80-Tb-99	527476	5447317	Gn
81-Tc-99	527476	5447317	Gn
82-Tp-99	527476	5447317	Gn
85-Th-99	526068	5451225	Gn

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
86-Tb-99	526068	5451225	Gn
87-Tc-99	526068	5451225	Gn
88-Tp-99	526068	5451225	Gn
91-Th-99	507951	5412205	Gr
92-Tb-99	507951	5412205	Gr
93-Tc-99	507951	5412205	Gr
94-Tp-99	507951	5412205	Gr
96-Th-99	508075	5416153	Gr
97-Tb-99	508075	5416153	Gr
98-Tc-99	508075	5416153	Gr
99-Tp-99	508075	5416153	Gr
116-Th-99	525856	5445906	Ms
117-Tb-99	525856	5445906	Ms
118-Tc-99	525856	5445906	Ms
119-Tp-99	525856	5445906	Ms
131-Th-99	535697	5435897	Ms
132-Tb-99	535697	5435897	Ms
133-Tc-99	535697	5435897	Ms
134-Tp-99	535697	5435897	Ms
140-Th-99	536471	5436671	Ms
141-Tb-99	536471	5436671	Ms
142-Tc-99	536471	5436671	Ms
143-Tp-99	536471	5436671	Ms
155-Th-99	528145	5434771	Um
156-Tb-99	528145	5434771	Um
157-Tc-99	528145	5434771	Um
159-Tp-99	528145	5434771	Um
164-Th-99	533544	5430312	Gr
165-Tb-99	533544	5430312	Gr
166-Tc-99	533544	5430312	Gr
168-Tp-99	533544	5430312	Gr
182-Th-99	525198	5442824	Ms
183-Tb-99	525198	5442824	Ms
184-Tc-99	525198	5442824	Ms
186-Tp-99	525198	5442824	Ms
193-Th-99	533573	5432806	Gr
194-Tb-99	533573	5432806	Gr
195-Tc-99	533573	5432806	Gr
197-Tp-99	533573	5432806	Gr
209-Th-99	521268	5429190	Mm
210-Tb-99	521268	5429190	Mm
211-Tc-99	521268	5429190	Mm
213-Tp-99	521268	5429190	Mm
214-Th-99	534610	5438279	Mm

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
215-Tb-99	534610	5438279	Mm
216-Tc-99	534610	5438279	Mm
218-Tp-99	534610	5438279	Mm
223-Th-99	534205	5442502	Ms
224-Tb-99	534205	5442502	Ms
225-Tc-99	534205	5442502	Ms
227-Tp-99	534205	5442502	Ms
236-Th-99	521763	5426312	Gn
237-Tb-99	521763	5426312	Gn
238-Tc-99	521763	5426312	Gn
240-Tp-99	521763	5426312	Gn
255-Th-99	518854	5424944	Mm
256-Tb-99	518854	5424944	Mm
257-Tc-99	518854	5424944	Mm
259-Tp-99	518854	5424944	Mm
265-Th-99	530244	5418963	Gn
266-Tb-99	530244	5418963	Gn
267-Tc-99	530244	5418963	Gn
269-Tp-99	530244	5418963	Gn
282-Th-99	512739	5454557	Ms
283-Tb-99	512739	5454557	Ms
284-Tc-99	512739	5454557	Ms
286-Tp-99	512739	5454557	Ms
291-Th-99	511022	5450847	Ms
292-Tb-99	511022	5450847	Ms
293-Tc-99	511022	5450847	Ms
295-Tp-99	511022	5450847	Ms
300-Th-99	511435	5446816	Ms
301-Tb-99	511435	5446816	Ms
302-Tc-99	511435	5446816	Ms
304-Tp-99	511435	5446816	Ms
325-Th-99	509765	5442599	Gn
326-Tb-99	509765	5442599	Gn
327-Tc-99	509765	5442599	Gn
329-Tp-99	509765	5442599	Gn
331-Th-99	505264	5452580	Ms
332-Tc-99	505264	5452580	Ms
334-Tp-99	505264	5452580	Ms
336-Th-99	509855	5417925	Gr
337-Tc-99	509855	5417925	Gr
339-Tp-99	509855	5417925	Gr
347-Th-99	530905	5420659	Gn
348-Tb-99	530905	5420659	Gn
349-Tc-99	530905	5420659	Gn
351-Tp-99	530905	5420659	Gn

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
352-Th-99	532230	5422258	Gr
353-Tb-99	532230	5422258	Gr
354-Tc-99	532230	5422258	Gr
356-Tp-99	532230	5422258	Gr
364-Th-99	502993	5412130	Fv
365-Tb-99	502993	5412130	Fv
366-Tc-99	502993	5412130	Fv
368-Tp-99	502993	5412130	Fv
385-Th-99	521425	5431817	Alk
386-Tb-99	521425	5431817	Alk
387-Tc-99	521425	5431817	Alk
389-Tp-99	521425	5431817	Alk
390-Th-99	521006	5431595	Alk
391-Tb-99	521006	5431595	Alk
392-Tc-99	521006	5431595	Alk
394-Tp-99	521006	5431595	Alk
395-Th-99	520854	5430833	Alk
396-Tb-99	520854	5430833	Alk
397-Tc-99	520854	5430833	Alk
399-Tp-99	520854	5430833	Alk
400-Th-99	520253	5430510	Alk
401-Tb-99	520253	5430510	Alk
402-Tc-99	520253	5430510	Alk
404-Tp-99	520253	5430510	Alk
422-Th-99	516172	5409326	Fv
423-Tb-99	516172	5409326	Fv
424-Tc-99	516172	5409326	Fv
426-Tp-99	516172	5409326	Fv
427-Th-99	516131	5409048	Fv
428-Tb-99	516131	5409048	Fv
429-Tc-99	516131	5409048	Fv
431-Tp-99	516131	5409048	Fv
432-Th-99	516281	5408885	Fv
433-Tb-99	516281	5408885	Fv
434-Tc-99	516281	5408885	Fv
436-Tp-99	516281	5408885	Fv
439-Th-99	516187	5408731	Fv
440-Tb-99	516187	5408731	Fv
441-Tc-99	516187	5408731	Fv
443-Tp-99	516187	5408731	Fv
444-Th-99	516167	5408491	Fv
445-Tb-99	516167	5408491	Fv
446-Tc-99	516167	5408491	Fv
448-Tp-99	516167	5408491	Fv
449-Th-99	516134	5408171	Fv

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
450-Tb-99	516134	5408171	Fv
451-Tc-99	516134	5408171	Fv
453-Tp-99	516134	5408171	Fv
454-Th-99	516226	5408070	Fv
455-Tb-99	516226	5408070	Fv
456-Tc-99	516226	5408070	Fv
458-Tp-99	516226	5408070	Fv
459-Th-99	515748	5408757	Fv
460-Tb-99	515748	5408757	Fv
461-Tc-99	515748	5408757	Fv
463-Tp-99	515748	5408757	Fv
468-Th-99	501518	5411772	Mv
469-Tb-99	501518	5411772	Mv
470-Tc-99	501518	5411772	Mv
472-Tp-99	501518	5411772	Mv
473-Th-99	501633	5411918	Mv
474-Tb-99	501633	5411918	Mv
475-Tc-99	501633	5411918	Mv
477-Tp-99	501633	5411918	Mv
478-Th-99	502137	5412198	Fv
479-Tb-99	502137	5412198	Fv
480-Tc-99	502137	5412198	Fv
482-Tp-99	502137	5412198	Fv
485-Th-99	502545	5412302	Fv
486-Tb-99	502545	5412302	Fv
487-Tc-99	502545	5412302	Fv
489-Tp-99	502545	5412302	Fv
494-Th-99	519421	5429926	Ms
495-Tb-99	519421	5429926	Ms
496-Tc-99	519421	5429926	Ms
498-Tp-99	519421	5429926	Ms
1002-Th-99	525400	5432200	Mm
1003-Tb-99	525400	5432200	Mm
1004-Tc-99	525400	5432200	Mm
1005-Tp-99	525400	5432200	Mm
1013-Th-99	509400	5428950	Ms
1014-Tb-99	509400	5428950	Ms
1015-Tc-99	509400	5428950	Ms
1016-Tp-99	509400	5428950	Ms
1020-Th-99	510215	5431576	Ms
1021-Tb-99	510215	5431576	Ms
1022-Tc-99	510215	5431576	Ms
1023-Tp-99	510215	5431576	Ms
1030-Th-99	517513	5448480	Gn
1031-Tb-99	517513	5448480	Gn
1032-Tc-99	517513	5448480	Gn
1033-Tp-99	517513	5448480	Gn
1035-Th-99	516186	5448149	Gn
1036-Tb-99	516186	5448149	Gn
1037-Tc-99	516186	5448149	Gn
1038-Tp-99	516186	5448149	Gn
1042-Th-99	519094	5451446	Ms
1043-Tb-99	519094	54514460	Ms
1044-Tc-99	519094	54514460	Ms
1051-Th-99	516595	5443913	Ms
1052-Tb-99	516595	5443913	Ms
1053-Tc-99	516595	5443913	Ms
1054-Tp-99	516595	5443913	Ms
1058-Th-99	516003	5441997	Ms
1059-Tb-99	516003	5441997	Ms
1060-Tc-99	516003	5441997	Ms
1061-Tp-99	516003	5441997	Ms
1069-Th-99	533785	5446721	Ms
1070-Tb-99	533785	5446721	Ms
1071-Tc-99	533785	5446721	Ms
1072-Tp-99	533785	5446721	Ms
1080-Th-99	528952	5442048	Ms
1081-Tb-99	528952	5442048	Ms
1082-Tc-99	528952	5442048	Ms
1083-Tp-99	528952	5442048	Ms
1095-Th-99	523952	5416757	Gr
1096-Tb-99	523952	5416757	Gr
1097-Tc-99	523952	5416757	Gr
1098-Tp-99	523952	5416757	Gr
1106-Th-99	524393	5414089	Gn
1107-Tb-99	524393	5414089	Gn
1108-Tc-99	524393	5414089	Gn
1123-Th-99	536068	5406362	Alk
1124-Tb-99	536068	5406362	Alk
1125-Tc-99	536068	5406362	Alk
1127-Tp-99	536068	5406362	Alk
1128-Th-99	535510	5402332	Alk
1129-Tb-99	535510	5402332	Alk
1130-Tc-99	535510	5402332	Alk
1132-Tp-99	535510	5402332	Alk
1138-Th-99	529724	5408068	Alk
1139-Tb-99	529724	5408068	Alk
1140-Tc-99	529724	5408068	Alk
1142-Tp-99	529724	5408068	Alk
1151-Th-99	530938	5402721	Alk

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
1152-Tb-99	530938	5402721	Alk
1153-Tc-99	530938	5402721	Alk
1155-Tp-99	530938	5402721	Alk
1158-Th-99	526340	5404646	Alk
1159-Tb-99	526340	5404646	Alk
1160-Tc-99	526340	5404646	Alk
1162-Tp-99	526340	5404646	Alk
1163-Th-99	523725	5406715	Mv
1164-Tb-99	523725	5406715	Mv
1165-Tc-99	523725	5406715	Mv
1167-Tp-99	523725	5406715	Mv
1176-Th-99	516983	5419063	Ms
1177-Tb-99	516983	5419063	Ms
1178-Tc-99	516983	5419063	Ms
1180-Tp-99	516983	5419063	Ms
1182-Th-99	519205	5419771	Gr
1183-Tb-99	519205	5419771	Gr
1184-Tc-99	519205	5419771	Gr
1186-Tp-99	519205	5419771	Gr
1192-Th-99	519800	5405814	Ms
1193-Tb-99	519800	5405814	Ms
1194-Tc-99	519800	5405814	Ms
1196-Tp-99	519800	5405814	Ms
1206-Th-99	505161	5432021	Ms
1207-Tb-99	505161	5432021	Ms
1208-Tc-99	505161	5432021	Ms
1210-Tp-99	505161	5432021	Ms
1217-Th-99	503903	5418547	Gr
1218-Tb-99	503903	5418547	Gr
1219-Tc-99	503903	5418547	Gr
1221-Tp-99	503903	5418547	Gr
1228-Th-99	503362	5422726	Mv
1229-Tb-99	503362	5422726	Mv
1230-Tc-99	503362	5422726	Mv
1232-Tp-99	503362	5422726	Mv
1237-Th-99	504139	5426612	Gr
1238-Tb-99	504139	5426612	Gr
1239-Tc-99	504139	5426612	Gr
1241-Tp-99	504139	5426612	Gr
1250-Th-99	517684	5404889	Ms
1251-Tb-99	517684	5404889	Ms
1252-Tc-99	517684	5404889	Ms
1254-Tp-99	517684	5404889	Ms
1272-Th-99	512190	5421365	Gr
1273-Tb-99	512190	5421365	Gr

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
1274-Tc-99	512190	5421365	Gr
1276-Tp-99	512190	5421365	Gr
1312-Th-99	517732	5427464	Gr
1313-Tb-99	517732	5427464	Gr
1314-Tc-99	517732	5427464	Gr
1316-Tp-99	517732	5427464	Gr
1335-Th-99	522035	5436425	Ms
1336-Tb-99	522035	5436425	Ms
1337-Tc-99	522035	5436425	Ms
1339-Tp-99	522035	5436425	Ms
8-Th-00	483601	5442135	Ms
9-Tb-00	483601	5442135	Ms
10-Tc-00	483601	5442135	Ms
11-Tp-00	483601	5442135	Ms
29-Th-00	494850	5448000	Gn
30-Tb-00	494850	5448000	Gn
31-Tc-00	494850	5448000	Gn
32-Tp-00	494850	5448000	Gn
48-Th-00	495804	5442936	Ms
49-Tb-00	495804	5442936	Ms
50-Tc-00	495804	5442936	Ms
51-Tp-00	495804	5442936	Ms
69-Th-00	493530	5454299	Ms
70-Tb-00	493530	5454299	Ms
71-Tc-00	493530	5454299	Ms
72-Tp-00	493530	5454299	Ms
74-Th-00	494737	5435257	Ms
75-Tb-00	494737	5435257	Ms
76-Tc-00	494737	5435257	Ms
77-Tp-00	494737	5435257	Ms
79-Th-00	494798	5434715	Ms
80-Tb-00	494798	5434715	Ms
81-Tc-00	494798	5434715	Ms
82-Tp-00	494798	5434715	Ms
84-Th-00	492668	5426882	Mv
85-Tb-00	492668	5426882	Mv
86-Tc-00	492668	5426882	Mv
87-Tp-00	492668	5426882	Mv
113-Th-00	486233	5429330	Mv
114-Tb-00	486233	5429330	Mv
115-Tc-00	486233	5429330	Mv
116-Tp-00	486233	5429330	Mv
155-Th-00	479053	5437975	Ms
156-Tb-00	479053	5437975	Ms
157-Tc-00	479053	5437975	Ms

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
158-Tp-00	479053	5437975	Ms
164-Th-00	478570	5433867	Ms
165-Tb-00	478570	5433867	Ms
166-Tc-00	478570	5433867	Ms
167-Tp-00	478570	5433867	Ms
169-Th-00	479541	5442098	Ms
170-Tb-00	479541	5442098	Ms
171-Tc-00	479541	5442098	Ms
172-Tp-00	479541	5442098	Ms
174-Th-00	476282	5438147	Ms
175-Tb-00	476282	5438147	Ms
176-Tc-00	476282	5438147	Ms
177-Tp-00	476282	5438147	Ms
203-Th-00	487195	5433331	Ms
204-Tb-00	487195	5433331	Ms
205-Tc-00	487195	5433331	Ms
206-Tp-00	487195	5433331	Ms
210-Th-00	490133	5422331	Gr
211-Tb-00	490133	5422331	Gr
212-Tc-00	490133	5422331	Gr
213-Tp-00	490133	5422331	Gr
217-Th-00	484988	5420771	Gr
218-Tb-00	484988	5420771	Gr
219-Tc-00	484988	5420771	Gr
220-Tp-00	484988	5420771	Gr
234-Th-00	478680	5407209	Gr
235-Tb-00	478680	5407209	Gr
236-Tc-00	478680	5407209	Gr
237-Tp-00	478680	5407209	Gr
243-Th-00	499747	5432466	Ms
244-Tb-00	499747	5432466	Ms
245-Tc-00	499747	5432466	Ms
246-Tp-00	499747	5432466	Ms
250-Th-00	498367	5427658	Ms
251-Tb-00	498367	5427658	Ms
252-Tc-00	498367	5427658	Ms
253-Tp-00	498367	5427658	Ms
263-Th-00	499489	5423446	Gn
264-Tb-00	499489	5423446	Gn
265-Tc-00	499489	5423446	Gn
266-Tp-00	499489	5423446	Gn
274-Th-00	474197	5412060	Gr
275-Tb-00	474197	5412060	Gr
276-Tc-00	474197	5412060	Gr
277-Tp-00	474197	5412060	Gr

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
279-Th-00	472848	5418069	Gr
280-Tb-00	472848	5418069	Gr
281-Tc-00	472848	5418069	Gr
282-Tp-00	472848	5418069	Gr
284-Th-00	473301	5408515	Gr
285-Tb-00	473301	5408515	Gr
286-Tc-00	473301	5408515	Gr
287-Tp-00	473301	5408515	Gr
289-Th-00	499575	5410531	Mv
290-Tb-00	499575	5410531	Mv
291-Tc-00	499575	5410531	Mv
292-Tp-00	499575	5410531	Mv
294-Th-00	473228	5424462	Um
295-Tb-00	473228	5424462	Um
296-Tc-00	473228	5424462	Um
297-Tp-00	473228	5424462	Um
301-Th-00	469983	5409065	Gr
302-Tb-00	469983	5409065	Gr
303-Tc-00	469983	5409065	Gr
304-Tp-00	469983	5409065	Gr
328-Th-00	500514	5386568	Mv
329-Tb-00	500514	5386568	Mv
330-Tc-00	500514	5386568	Mv
331-Tp-00	500514	5386568	Mv
347-Th-00	492504	5409192	Mv
348-Tb-00	492504	5409192	Mv
349-Tc-00	492504	5409192	Mv
350-Tp-00	492504	5409192	Mv
352-Th-00	471641	5409544	Gr
353-Tb-00	471641	5409544	Gr
354-Tc-00	471641	5409544	Gr
355-Tp-00	471641	5409544	Gr
369-Th-00	470775	5402459	Fv
370-Tb-00	470775	5402459	Fv
371-Tc-00	470775	5402459	Fv
372-Tp-00	470775	5402459	Fv
430-Th-00	484402	5430696	Ms
431-Tb-00	484402	5430696	Ms
432-Tc-00	484402	5430696	Ms
433-Tp-00	484402	5430696	Ms
435-Th-00	488695	5428153	Mv
436-Tb-00	488695	5428153	Mv
437-Tc-00	488695	5428153	Mv
438-Tp-00	488695	5428153	Mv
444-Th-00	496533	5417684	Fv

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s Easting	U.T.M.s Northing	Associated Bedrock
445-Tb-00	496533	5417684	Fv
446-Tc-00	496533	5417684	Fv
447-Tp-00	496533	5417684	Fv
453-Th-00	502368	5412325	Mv
454-Tb-00	502368	5412325	Mv
455-Tc-00	502368	5412325	Mv
456-Tp-00	502368	5412325	Mv
1002-Th-00	484537	5436937	Ms
1003-Tb-00	484537	5436937	Ms
1004-Tc-00	484537	5436937	Ms
1005-Tp-00	484537	5436937	Ms
1007-Th-00	499802	5452292	Ms
1008-Tb-00	499802	5452292	Ms
1009-Tc-00	499802	5452292	Ms
1010-Tp-00	499802	5452292	Ms
1016-Th-00	498531	5448365	Gn
1017-Tb-00	498531	5448365	Gn
1018-Tc-00	498531	5448365	Gn
1019-Tp-00	498531	5448365	Gn
1023-Th-00	497791	5443425	Ms
1024-Tb-00	497791	5443425	Ms
1025-Tc-00	497791	5443425	Ms
1026-Tp-00	497791	5443425	Ms
1048-Th-00	484016	5447109	Gn
1049-Tb-00	484016	5447109	Gn
1050-Tc-00	484016	5447109	Gn
1051-Tp-00	484016	5447109	Gn
1062-Th-00	479556	5447053	Ms
1063-Tb-00	479556	5447053	Ms
1064-Tc-00	479556	5447053	Ms
1065-Tp-00	479556	5447053	Ms
1067-Th-00	483325	5451473	Ms
1068-Tb-00	483325	5451473	Ms
1069-Tc-00	483325	5451473	Ms
1070-Tp-00	483325	5451473	Ms
1078-Th-00	480044	5453557	Ms
1079-Tb-00	480044	5453557	Ms
1080-Tc-00	480044	5453557	Ms
1081-Tp-00	480044	5453557	Ms
1087-Th-00	494172	5421125	Gr
1088-Tb-00	494172	5421125	Gr
1089-Tc-00	494172	5421125	Gr
1090-Tp-00	494172	5421125	Gr
1096-Th-00	475720	5450847	Ms
1097-Tb-00	475720	5450847	Ms
1098-Tc-00	475720	5450847	Ms
1099-Tp-00	475720	5450847	Ms
1115-Th-00	488634	5453728	Ms
1116-Tb-00	488634	5453728	Ms
1117-Tc-00	488634	5453728	Ms
1118-Tp-00	488634	5453728	Ms
1124-Th-00	488668	5449676	Ms
1125-Tb-00	488668	5449676	Ms
1126-Tc-00	488668	5449676	Ms
1127-Tp-00	488668	5449676	Ms
1137-Th-00	470560	5445620	Ms
1138-Tb-00	470560	5445620	Ms
1139-Tc-00	470560	5445620	Ms
1140-Tp-00	470560	5445620	Ms
1148-Th-00	474239	5446841	Ms
1149-Tb-00	474239	5446841	Ms
1150-Tc-00	474239	5446841	Ms
1151-Tp-00	474239	5446841	Ms
1174-Th-00	498183	5417268	Fv
1175-Tb-00	498183	5417268	Fv
1176-Tc-00	498183	5417268	Fv
1177-Tp-00	498183	5417268	Fv
1183-Th-00	496271	5413982	Mv
1184-Tb-00	496271	5413982	Mv
1185-Tc-00	496271	5413982	Mv
1186-Tp-00	496271	5413982	Mv
1196-Th-00	487606	5407888	Mv
1197-Tb-00	487606	5407888	Mv
1198-Tc-00	487606	5407888	Mv
1199-Tp-00	487606	5407888	Mv
1209-Th-00	484966	5406754	Mv
1210-Tb-00	484966	5406754	Mv
1211-Tc-00	484966	5406754	Mv
1212-Tp-00	484966	5406754	Mv
1220-Th-00	480040	5401911	Fv
1221-Tb-00	480040	5401911	Fv
1222-Tc-00	480040	5401911	Fv
1223-Tp-00	480040	5401911	Fv
1236-Th-00	466236	5403996	Fv
1237-Tb-00	466236	5403996	Fv
1238-Tc-00	466236	5403996	Fv
1239-Tp-00	466236	5403996	Fv
1241-Th-00	464154	5406430	Gr
1242-Tb-00	464154	5406430	Gr
1243-Tc-00	464154	5406430	Gr

Appendix A: Sample Site Locations (Continued)

Sample Number/ Material	U.T.M.s		Associated Bedrock
	Easting	Northing	
1244-Tp-00	464154	5406430	Gr
1246-Tp-00	472101	5424760	Gr
1251-Tp-00	472456	5421828	Gr
1255-Th-00	495459	5390341	Mv
1256-Tb-00	495459	5390341	Mv
1257-Tc-00	495459	5390341	Mv

Sample Number/ Material	U.T.M.s		Associated Bedrock
	Easting	Northing	
1258-Tp-00	495459	5390341	Mv
1266-Tp-00	473379	5415409	Gr
1270-Tp-00	472194	5416899	Gr
1272-Tp-00	472194	5416899	Gr
1281-Tp-00	473932	5412189	Gr

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
		LENGTH			
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
		AREA			
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
		VOLUME			
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
		CAPACITY			
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
		MASS			
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
		CONCENTRATION			
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.